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# Macworld

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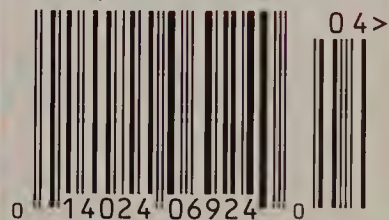
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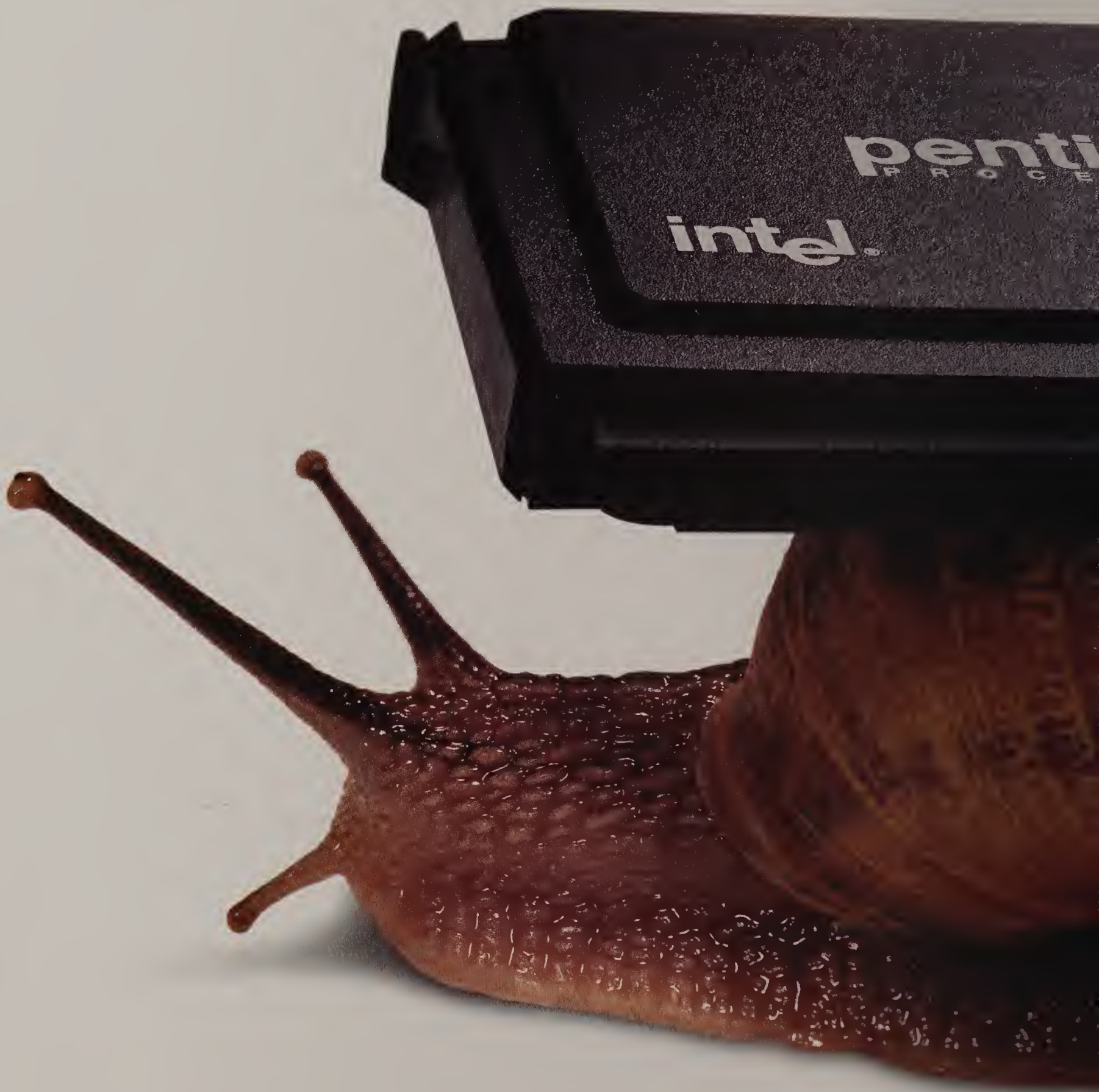
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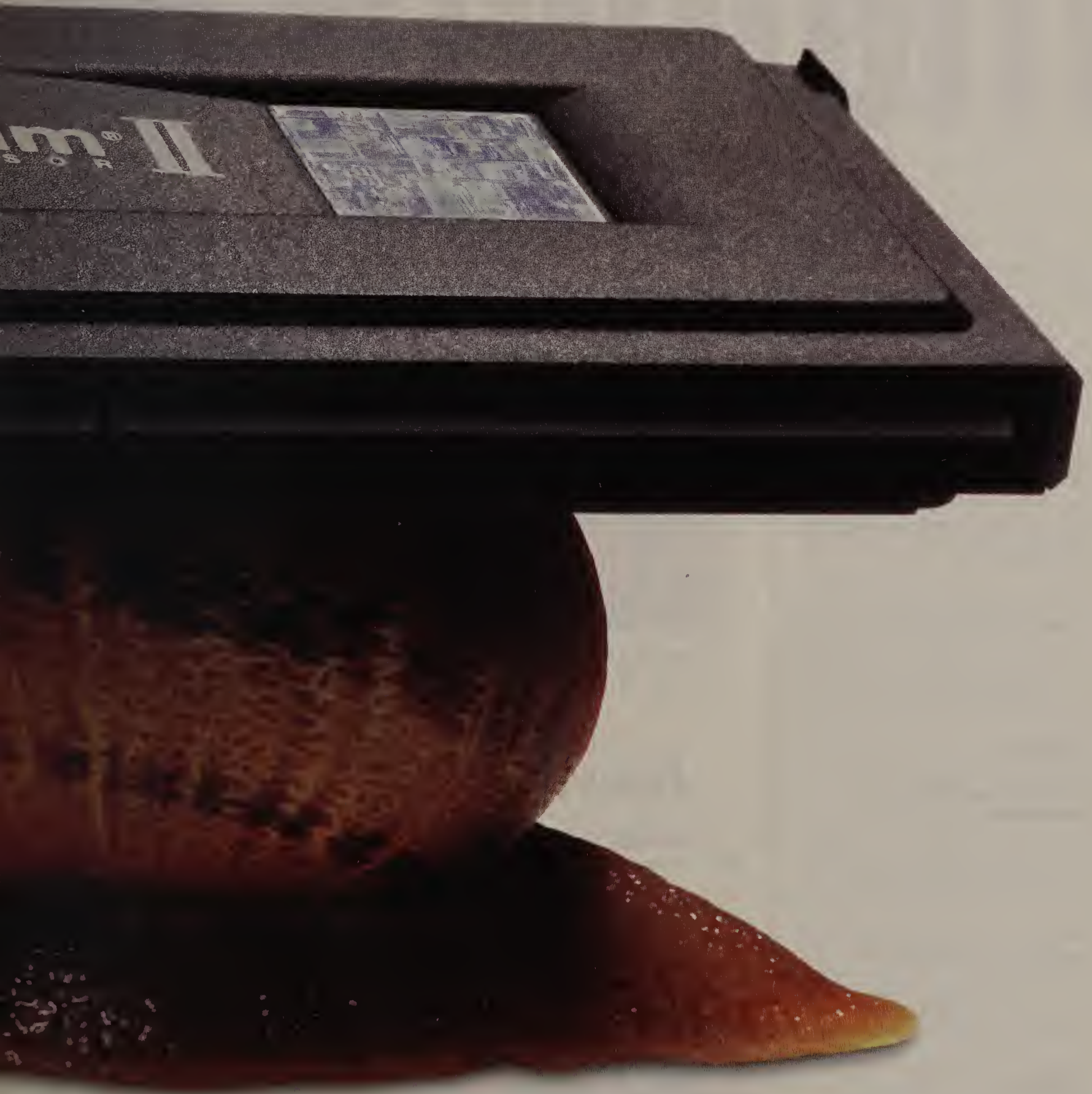
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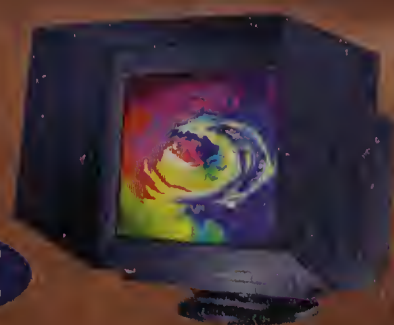


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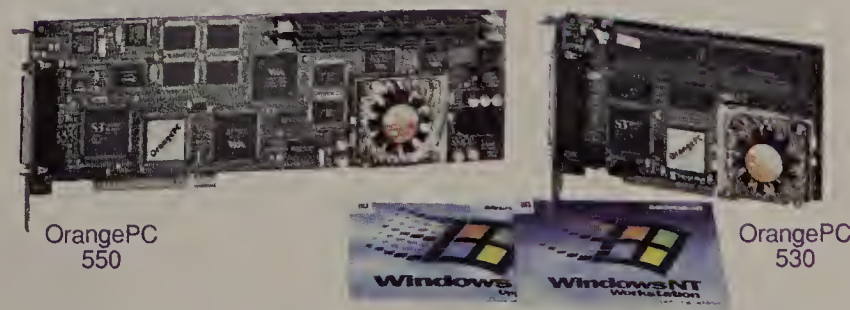
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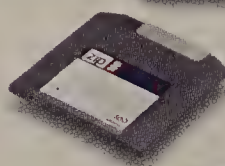
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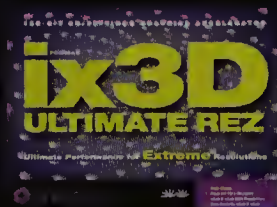
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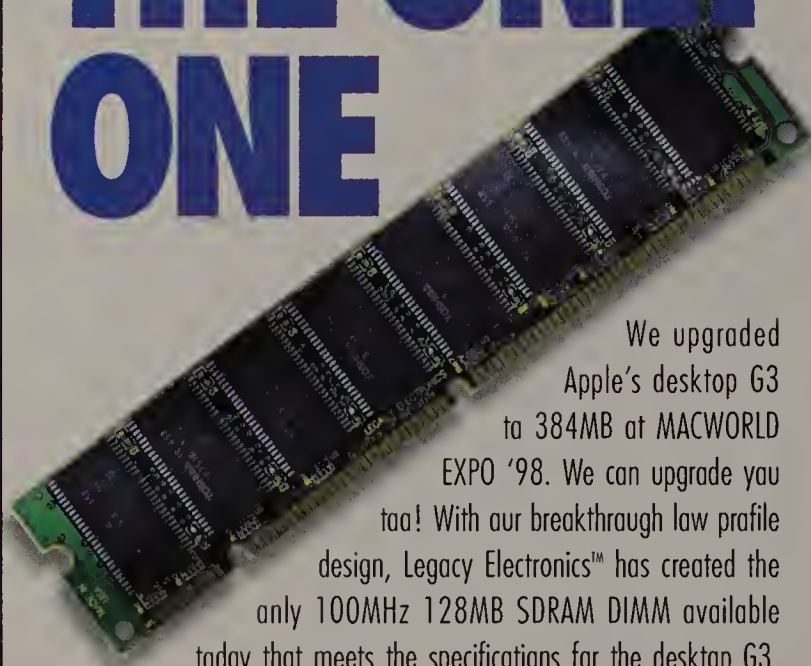
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# Letters

## Missing Andy, Bob, Chris, and Jim

I WAS DISAPPOINTED TO SEE THAT Andy Ihnatko will no longer be writing for your magazine ("Transitions," January 1998). You are losing one of the best columnists of both *Macworld* and *MacUser*. Andy's column was unique, a nice change of pace in the middle of all the news, reviews, and oh-so-serious columnists discussing the oh-so-serious state of Apple and the Mac.

Andy's column allowed for humor in the magazine. Face it—without some levity, *Macworld* might as well be one of those dime-a-dozen PC business magazines that just happens to cover the Mac.

You have succeeded in one thing: I can now read *Macworld* from cover to cover without cracking a smile. Congratulations, I guess.

DAVID GOFF  
San Antonio, Texas

ANDY IHNATKO IS ONE OF THE FEW technically savvy people that I have read who is intentionally humorous. Every month, the first page I turned to was Andy's column. After the merger of *Macworld* and *MacUser*, I was relieved to see that he was not lost in the shuffle. Now that I find he is a goner, I am very distressed. He will be very sorely missed by a lot of fans.

RICHARD BEIRNE  
via Macworld Online

WHEN I ASKED MY NEW DOWNSTAIRS neighbor where she was from and she said, "the former Yugoslavia," I wondered what it would be like to be from a "former" place. As a member of the Mac community, I'm starting to get an idea.

The bemused possessor of a "former" Power Computing box, I also have a sub-



scription to the "former" *MacUser*. With this issue I learn that Andy Ihnatko and the team of Bob LeVitus and Christopher Breen ("Help Folder," January 1998) are about to become "former" columnists. Bummer. These guys have style, know a lot, and are irreverent without becoming tedious about it. They brought a little more fun into my life. I'm sorry to see them go.

LUCY TINKCOMBE  
Boston, Massachusetts

I'M SORRY TO SEE THAT JIM HEID IS leaving *Macworld*. There are those of us out here in Macdom who have been with him since the start, and will miss him. Jim's articles have always been timely and informative. He has helped us learn, and it's been appreciated.

MIKE CHICHESTER  
Spring Hill, Florida

*We, too, will miss the columns from these contributors. But look for their continued contributions*

*in other sections of the new Macworld. A merger is never easy and there wasn't room for everyone, but we're doing our best to keep the original MacUser and Macworld contributors involved in the new Macworld.—Ed.*

## Top-Notch Typography

KATHLEEN TINKEL'S "10 TYPOGRAPHICAL Blunders" is excellent (January 1998)! Her article is invaluable for people in my position, untrained in page design but responsible for helping make it look better. We publish four magazines, and I am sure we are committing several of these blunders. Thanks!

DEREK NELSON  
Norfolk, Virginia

I SET AND POLICE TYPE STYLES AT the *Watertown Daily Times* in New York. Kathleen Tinkel made one blunder in her article: you can't generalize that it's better to set type ragged. Studies have found that it's far easier for readers to deal with lines of the same length—justified—if the text goes on at length without interruption. Newspaper news stories and novels are almost invariably set justified.

On the other hand, in a treatment such as a newspaper feature, magazine article, or art book where the text is broken by pictures, ragged type is attractive and acceptable.

MARK HOLBERG  
Watertown, New York

WHAT A WONDERFUL ARTICLE! I wish I could have shown it to a couple of hundred clients over the years. Kathleen Tinkel does a superb job of pointing out many of the pitfalls that await the novice.

*continues*



## CORRECTIONS

- The \$1,999 base-model Power Mac G3/233 system ("Apple's Next-Generation Systems," January 1998) does not include a modem; the modem is \$150 extra. The G3 tower model has only three slots for RAM, not six. You can still install up to 384MB of RAM, due to the tower case's allowing taller 128MB RAM modules.

I would add two more to the list: First, be conservative in how many fonts you use in a document. If you use more than three fonts on a page, you should have a pretty good reason. The second is one of my pet peeves, a mistake I see a lot of pros making: before you use all caps, be sure it's appropriate for your font. Old English and italic faces, for example, should never be set in all caps.

TIM DONOHUE  
Grand Rapids, Michigan

## Quicken Still Falls Short

WENDY SHARP'S REVIEW OF INTUIT's Quicken Deluxe 98 (January 1998) gave it an overall positive rating. However, the Investment portion of the program is still filled with bugs and problems that have existed since Quicken 4. Quicken does not know the difference between options, bonds, mutual funds, stocks, or money-market funds. Major inadequacies in Quicken, such as its inability to report capital gains and losses for any short sales or covered call writes and its incorrect calculation of ROIs, have plagued it for years. Intuit has been aware of these investment issues and still has not fixed any of them.

MONTY LEE  
via Macworld Online

EVERY REVIEW OF QUICKEN FOR the past three years overlooks one feature where it falls short: Cash Flow Forecasting. Quicken clumsily bases cash flow on the Calendar instead of the Budget, necessitating re-entry of all your information. Cash-flow forecasting based on the budget is very useful for maintaining checking balances and preparing for investing or spending.

BILL BRAAK  
Colorado Springs, Colorado

## Cultivating a New Generation

MY FIVE-YEAR-OLD DAUGHTER AND I were watching television when the Emergency Broadcast System test came on. My daughter immediately grabbed the remote and turned the TV off and back on. "It bombed and we have to restart it," she informed me.

She is a real Mac child—I guess that's why I put up with her constantly changing the desktop pattern to teddy bears.

JOHN AFFLECK  
Maple Ridge, British Columbia, Canada

FOR OUR HOMEWORK ASSIGNMENT in my ninth-grade computer class we had to find any article remotely connected to computers and enter it for typing practice. When I saw David Pogue's article, I knew my search was over (*The Desktop Critic*, January 1998).

Unfortunately, my school uses PCs. Although normally I would never lower myself to using anything other than a Mac, I am forced by this country's educational system to submit myself to torture by means of Windows 95.

When I received this assignment I saw it as a chance to stand up for what I believe in. My class, including my teacher, got a good laugh out of my article, and it is with joy that I say she may finally be seeing the light. In the meantime I will continue to read David Pogue's articles in hopes of inspiring other poor lost souls in PC land to return to the place they know they belong.

DEVORA WHITMAN  
New Haven, Connecticut

## Genealogy Gripes

I DIDN'T KNOW WHETHER TO LAUGH or cry at the reviews of Family Tree Maker Deluxe and Ultimate Family Tree Deluxe (January 1998). While I have never used either, I had purchased Ultimate Family Tree at what I thought was a bargain price of \$18.05, until I opened the box. I decided to laugh and continue using Personal Ancestral File 2.3.1, developed by the Church of Jesus Christ of Latter-Day Saints. While the Mac version leaves several things to be desired, it's right up there with Leister Productions' Reunion.

SHARRON STANDIFER ASHTON  
Norman, Oklahoma

MACWORLD'S REVIEW OF GENEALOGY software was informative but failed to mention one feature important to anyone seriously into genealogy: the ability to save the data in GED format. This standard format is used for sharing information between different computers and programs. I should also mention a good shareware program, Gene 4.2, from Diana and David Eppstein. It may not have all the bells and whistles of Reunion, but it has easy data entry; saves in HTML and GED formats; and has most of the same features, including reports, charts, and the ability to link pictures to cards. For the shareware price of \$15 it's a great bargain and a good place to start for anyone who finds the price of Reunion a bit steep.

KENT LORENTZEN  
Jacobson, Minnesota

## OS 8 Ain't So Great

EARLIER IN THE YEAR I BOUGHT A Performa 6400/200 and installed Mac OS 8. One week later my system started its ominous, slow descent into computer hell. First it wouldn't load the final five extensions upon start-up, and then it wouldn't boot altogether. I did the usual diagnostics, but to no avail.

When I called Apple Support they apologetically told me that OS 8 has a major problem with the Performa drivers. They mailed me a free update, and all was forgiven—until now. The slow descent has started again. Am I going to need to update my drivers every time something goes wrong with this piece of technology? Why didn't Apple plainly state this problem to people who bought the OS 8 upgrade? I think I'll dump System 8 for good ole 7.5.

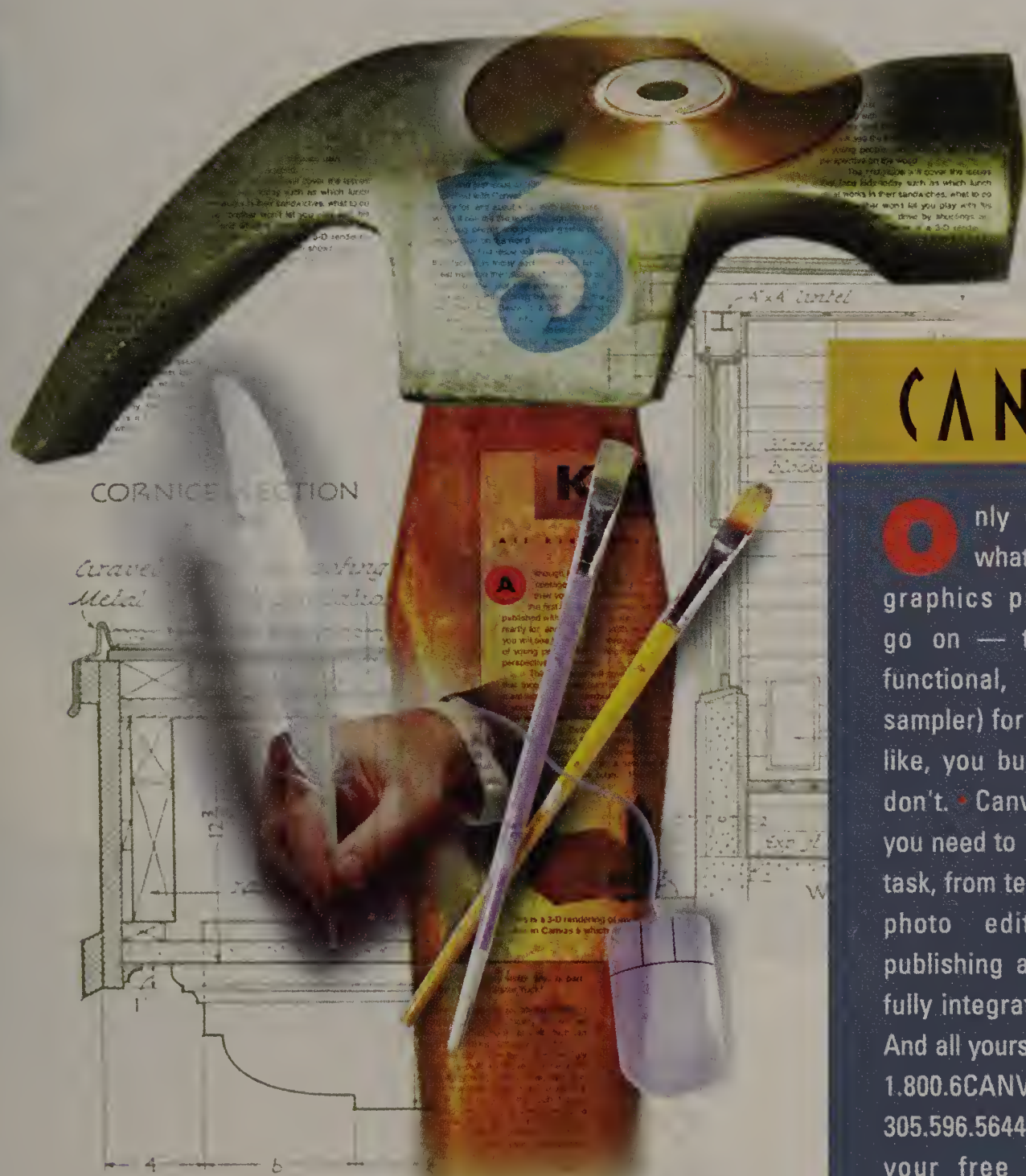
TERY HOLLY  
via Macworld Online

Letters should be sent to *Letters*, Macworld, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically via CompuServe (70370,702), MCI Mail (294-8078), America Online (keyword Macworld), AppleLink (Macworld1), or the Internet (letters@macworld.com). Include a return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld. **m**



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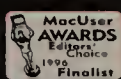
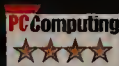
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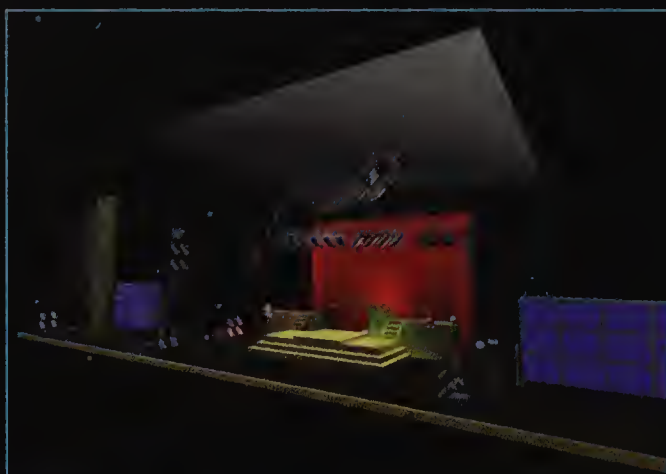
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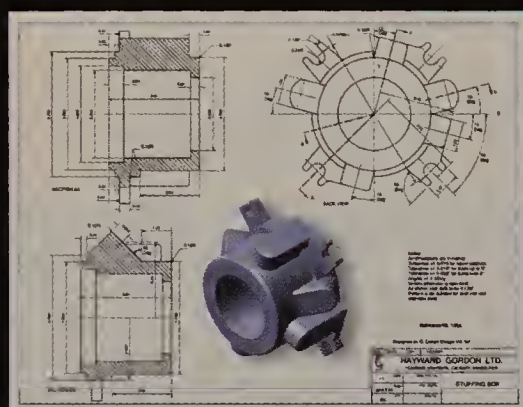


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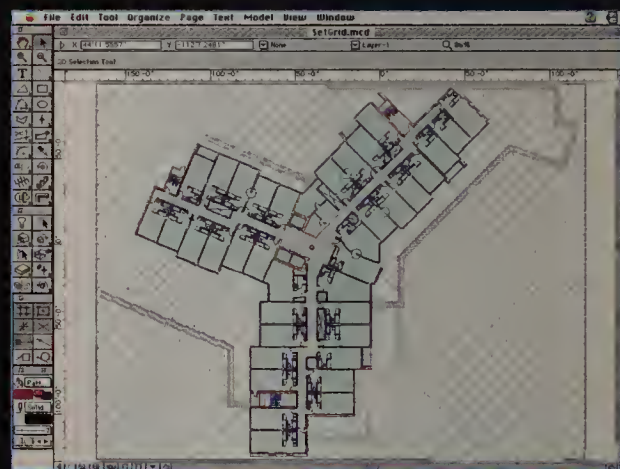
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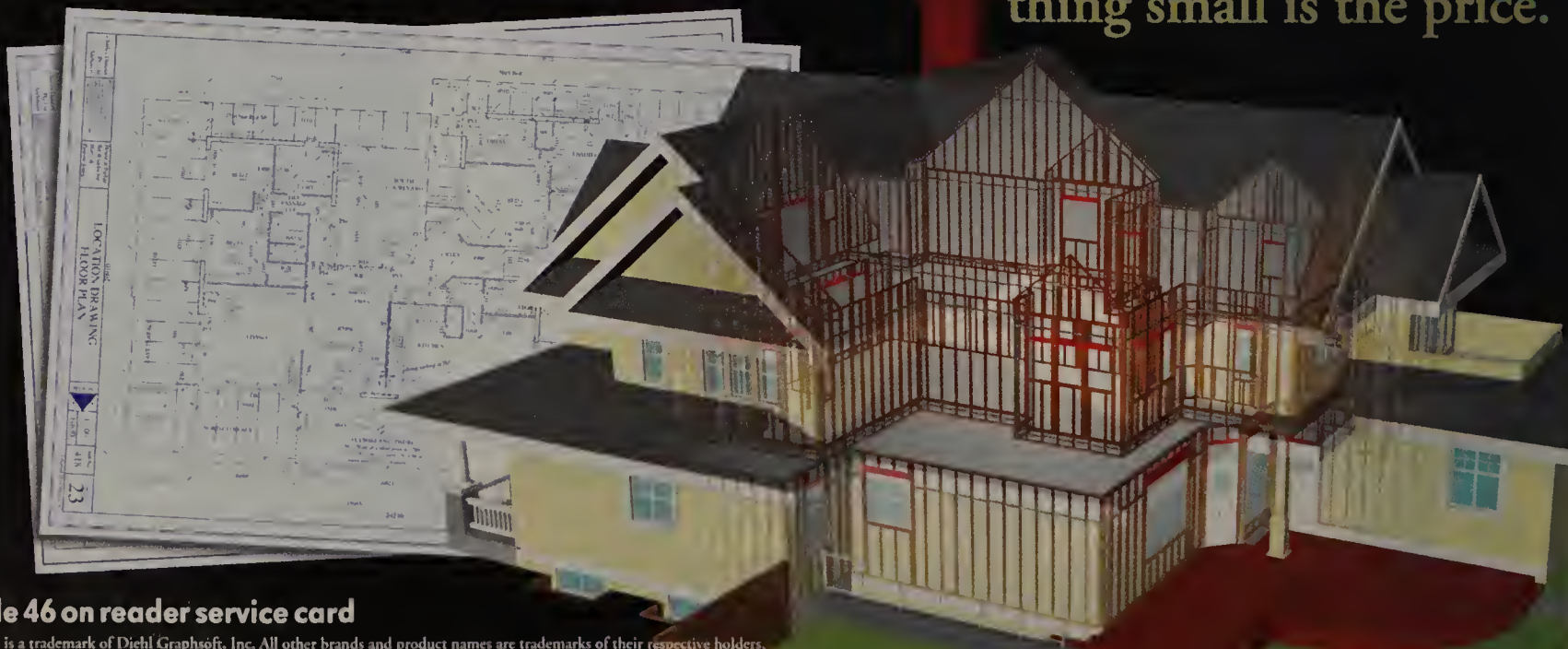
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# The Vision Thing

by Andrew Gore

## Look, Up in the Sky . . . It's SuperChip!

THE RUMORS OF THE POWERPC'S DEATH HAVE BEEN GREATLY EXAGGERATED

SOMETIMES THE MOST damning insult is the one that comes dressed as a compliment. Take the recent commentaries by PC pundits about the PowerPC microprocessor architecture that the Power Mac is based on. The pundits believe that, despite its current speed and price advantages over the Pentium, the PowerPC's decline into irrelevance is inevitable.

One analyst went so far as to say that the PowerPC 750, also known as the G3, delivers impressive performance *only* when you take its price into consideration . . . as if this were a bad thing! His ultimate point was that Intel would, in the not-too-distant future, be delivering processors that could meet or beat the 750.

OK, I can play by those rules. Let's talk about the future. Let's talk about speed so fast that companies building products using the PowerPC are going to have to add an extra zero to the names of their products.

By the time you read this, PowerPC partner IBM will have announced a major breakthrough in PowerPC technology. By next year, there will be PowerPC chips running at 1 *gigahertz*—that's 1,000 megahertz—thanks to an IBM innovation that uses copper instead of aluminum to make computer chips.

### Faster Than a Speeding Bullet

Even assuming that what the pundits claim about new Intel chips is true, the 1GHz PowerPC should still be here sooner, run faster, and cost less.

The first new chips probably won't break the gigahertz barrier—expect to see them late this year, running at about 500MHz. But once the copper-chip process is up and running, it will be possible for PowerPC-based Macs to make even multiprocessing Windows NT boxes seem sluggish.

Of course, as these selfsame multi-processor NT workstations are currently proving, speed is fairly meaningless if most users can't afford it. That's why the 750's unique combination of high speed and low cost is so critical and why, as the PowerPC zooms into the Gigahertz Zone, it will be critical that the chips be affordable and flexible.

Think about it: the 750 is the only high-performance chip that appears in low-end as well as high-end computers and portables as well as towers. This must continue to be the hallmark of the PowerPC, with the G3 and beyond. Intel will *always* have something faster in the Not-Too-Distant Future. The PowerPC's goal

thing beyond the obvious speed boosts to current hertz-hungry applications.

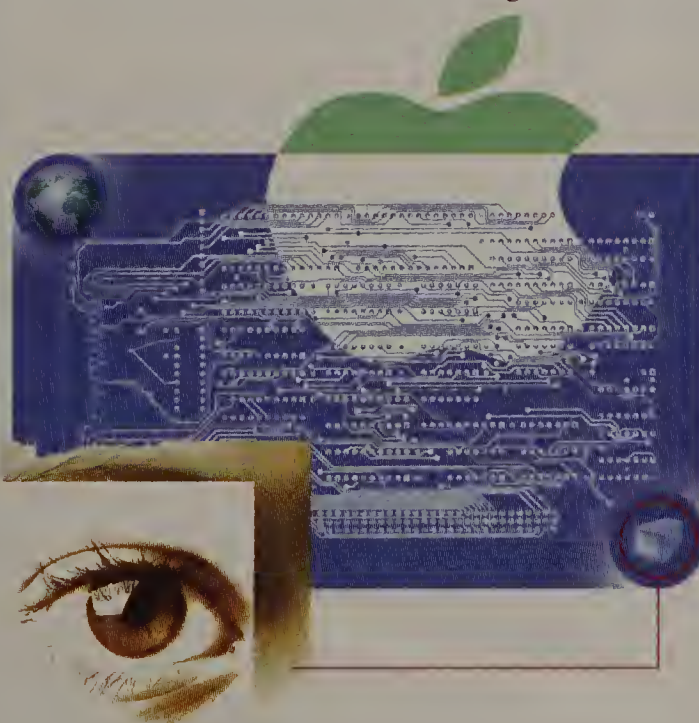
First, Windows emulation should be built into the operating system. If new processors end up being more than twice as fast as Intel chips, then it should be possible to offer no-compromise Windows emulation on the Mac. (As you can see from our story "Can the Mac Really Do Windows?" elsewhere in this issue, effective Windows emulation doesn't exist just yet.) Imagine the irony if, in 1999, the best computer to run Windows applications turns out to be . . . a Macintosh. Talk about thinking different!

The next-generation Mac should also offer a significant improvement in its interface. While hardware has advanced tremendously in just the last few years, the interface that runs on those machines hasn't made any quantum leaps in over a decade.

Now it's time to take advantage of that processing power to effect real change. For example, Apple could assume that every Mac has an Internet connection and follow the interface implications from there. And voice recognition should become an integral part of the operation of the computer. IBM has amazing voice-recognition technology in its labs that's just waiting for a desktop computer fast enough, and an operating-system developer clever enough, to make voice a truly powerful way to work with a computer.

Before you scoff at this idea, remember that there once was a time when people thought that controlling your computer with an upside-down trackball was pretty dumb. But 200 million mouse users can't be wrong. **m**

*I'm sorry, Dave. I can't do that. However, I can forward your comments on this column to [visionthing@macworld.com](mailto:visionthing@macworld.com).*



must be to keep performance affordable and accessible. Think of it as Performance for the Rest of Us.

### More Powerful Than a Locomotive

Just as speed is meaningless if you can't afford it, it's also worthless if there aren't good uses for it. Running Microsoft Word ten times faster might be nice, but it's hardly a compelling use of 1GHz of processing punch. When the first Macs featuring next-generation PowerPC chips arrive, they'll need to offer users some-



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# News

multimedia

## Apple Delivers QuickTime 3.0

BUT KEY AUTHORING  
APPLICATIONS AWAIT  
UPGRADES

by Stephen Beale

**Q**uickTime 3.0, the latest version of Apple's multimedia system software, is finally here—with a fast new video compressor and a long list of other enhancements. But don't expect to see QuickTime 3.0 movies dancing across your screen anytime soon. To create QuickTime 3.0 movies, you'll need QuickTime 3.0-enabled production tools, and so far only a handful of authoring packages support the new software.

QuickTime, one of Apple's few unabashed success stories of recent years, provides software developers with a rich set of resources for producing and playing back multimedia content. Its most visible component is the QuickTime movie, which can play synchronized tracks of video, audio, and text. But QuickTime also offers a wide range of system-level multimedia functions, including the ability

to import and export more than 50 media types. This makes it much easier for developers to add new video, audio, and animation features to CD-ROM titles and multimedia-production tools (see "What's New in QuickTime 3.0," in this section).

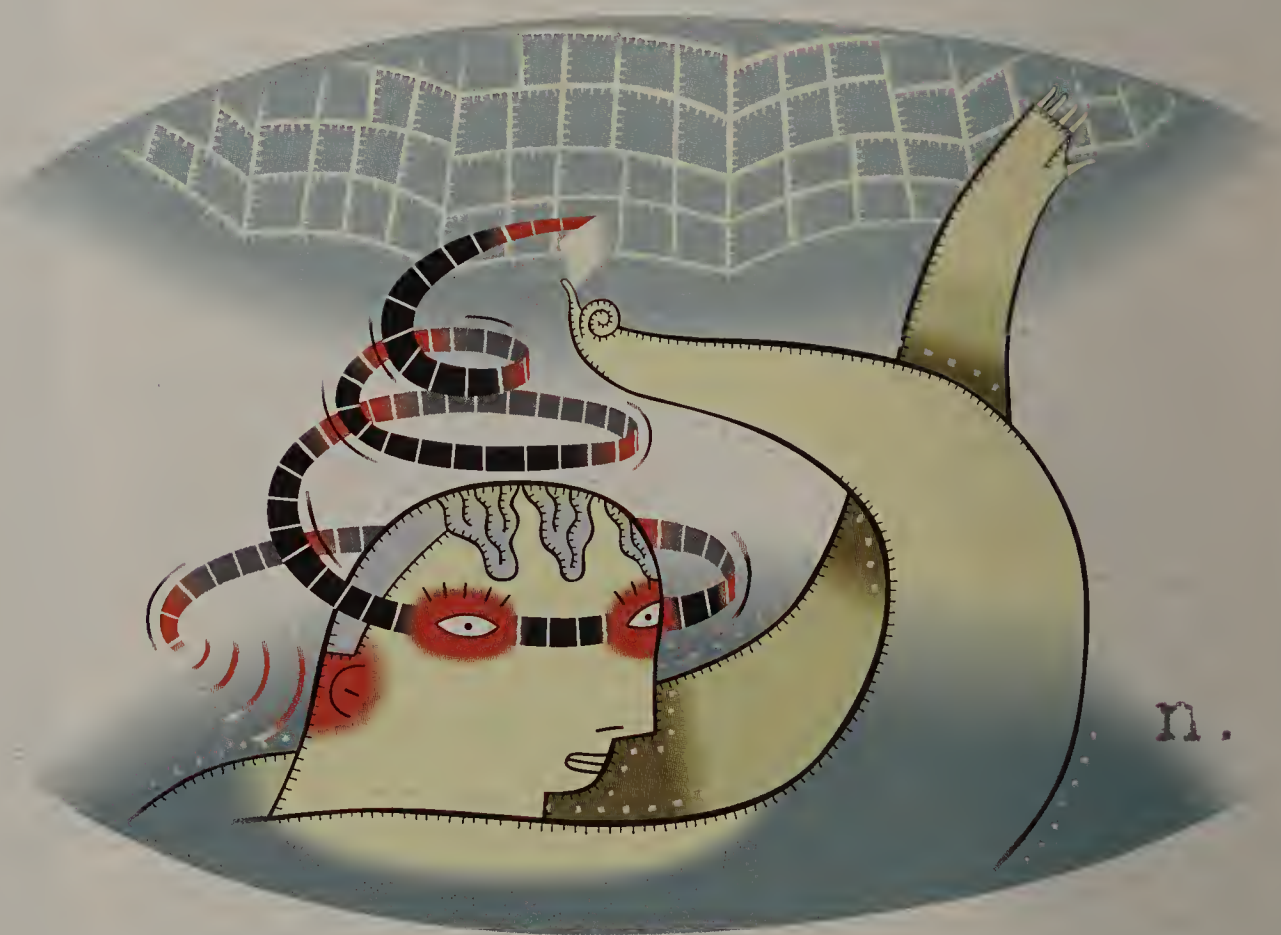
Apple first announced QuickTime 3.0 about a year ago, offering sneak previews of

a new video-effects architecture that lets you apply Adobe Photoshop-style filters in real time to moving images. The company posted a beta version of QuickTime 3.0 on December 1, 1997; the final release was scheduled to hit Apple's Web site ([www.apple.com/quicktime/](http://www.apple.com/quicktime/)) in early February.

There is no charge to download the software, which

includes a new version of the browser plug-in for viewing QuickTime movies on the World Wide Web.

**Early Applications** Dozens of hardware and software vendors have announced that they plan to support QuickTime 3.0 in future products. But so far, only a few authoring programs offer access to QuickTime's new features.





To get the ball rolling, Apple announced HyperCard 2.4, a \$99 update to its authoring software, which can open any QuickTime 3.0-readable file, including QuickTime VR panoramas.

HyperCard's scripting language lets you use a Find command to navigate to any portion of a QuickTime movie text track. You can also use scripting commands to scale, flip, mirror, rotate, and skew QuickTime movies.

At Macworld Expo in San Francisco, Apple's chief QuickTime architect, Peter Hoddie, demonstrated a \$30 program called QuickTime Pro that lets you drag and drop one QuickTime movie into another. However, Apple has not offered further details on the software, such as what other features it may offer or when it will ship.

Among other developers, Scitex Digital Video (415/369-5111, [www.scitexdv.com](http://www.scitexdv.com)) announced support for QuickTime 3.0 in Microsphere, its \$2,000 digital-video-editing package. Script Software (916/546-9005, [www.scriptsoftware.com](http://www.scriptsoftware.com)) has released iView, a free QuickTime 3.0-based media-cataloging program that can be downloaded from the company's Web site.

Macromedia (415/252-2000, [www.macromedia.com](http://www.macromedia.com)) has developed a QuickTime 3.0 Asset Xtra for Director and Authorware that lets you crop, mask, rotate, and scale imported QuickTime movies. The \$200 plug-in should be available by the time you read this. Macromedia says that Final Cut, its forthcoming digital-video-editing software, will offer full support for QuickTime 3.0.

Adobe Systems (408/536-6000, [www.adobe.com](http://www.adobe.com)) has offered few specifics on its plans for QuickTime 3.0. However, *MacWeek*, citing

*continues on page 28*

## industry

# Apple Dismantles Claris

FILEMAKER, HOME PAGE

GO TO NEW COMPANY

by Stephen Beale

**A**pple's revitalization efforts took an unexpected turn January 27, when the company announced that Claris, its ten-year-old software subsidiary, will be rechristened FileMaker, Inc., and will focus exclusively on the FileMaker Pro database and Home Page Web authoring tool. Apple—at least for now—will assume responsibility for other Claris products, including ClarisWorks, EMailer, Impact, and Draw, as well as Mac OS 8, HyperCard, and other Apple-branded software that was distributed by Claris. Some 300 Claris employees, including an unspecified number involved in software development, will lose their jobs. Apple declined to say how many employees would remain.

**FileMaker Rocks** Apple says that FileMaker Pro, the best-selling database software for the Macintosh, is also the second-leading file manager for Microsoft Windows, which now accounts for about half of the product's sales. The restructuring theoretically frees the subsidiary to pursue the Windows market as Apple focuses on the Mac OS. Home Page remains in the FileMaker fold due to the program's tight integration with the database software. FileMaker Pro 4, released last year, includes features that make it easier to put databases on the Web.

Claris president Domi-

nique Goupil, who retains the top spot in FileMaker, Inc., says the subsidiary has other database and Web publishing products in development. Forthcoming products will build on FileMaker Pro's reputation as an easy-to-use database.

**Murky Future** Prospects are murkier for the Claris-branded products that have returned to Apple's fold. Apple executives say that ClarisWorks remains a strategic asset for the company; Apple bundles the integrated productivity software with its Mac systems and claims that it is the best-selling productivity package in the education market. However, ClarisWorks for Windows could be in trouble; Apple says the Mac version will get the lion's share of attention.

Apple would not comment on plans for the other Claris packages, but EMailer in particular appears to be living on borrowed time. Jud Spencer, the only programmer credited on the e-mail client, has moved to Microsoft and is working on the Mac version of Outlook Express, the e-mail software bundled with Internet Explorer.

**Missing Details** Apple executives were cagey when discussing the 300 layoffs associated with the Claris restructuring. Claiming that the Claris and Apple workforces are intertwined, Apple would not reveal Claris's total employment, making it difficult to assess the move's overall impact on the subsidiary's bottom line. However, analysts who follow Apple say the layoffs represent 30 to 40 percent of Claris employees.

Apple says the layoffs were "across the board," affecting personnel involved in software development in addition to sales and marketing. The com-

pany would not reveal how many programmers were let go, but the magnitude of the layoffs strongly suggests that Apple plans to curtail development on at least some of the Claris-branded products.

## storage

# The Year of Mac DVD?

AS DVD HEATS UP, E4 BRINGS THE FIRST DRIVES TO THE MACINTOSH

by Jeffy Milstead

**D**VD, the high-capacity successor to the compact disc, is suddenly hot. Consumer DVD players are filling electronics stores, and more than 300 DVD movie titles are now available. They're fast becoming standard equipment on PCs. And now Apple has added support for DVD's Universal Disk Format in Mac OS 8.1.

There's just one small problem: the currently available DVD drives use the IDE interface found in PCs and



E4's CoolDVD is the first DVD drive for the Macintosh.

Apple's latest Macs; they do not support the SCSI connections in older Mac models. As a result, drives for PCs have been available for more than a year, while Mac users have been forced to wait. However,

*continues*



the wait for the latest DVD wrinkle—rewritable DVD-RAM—may be over soon with drives hitting catalogs this March. Hitachi is leading the pack with its first DVD-RAM drive, but you can expect to see rewritable drives from Toshiba and Panasonic as well.

**E4 Debuts** The first Macs with built-in DVD drives are scheduled to appear by mid-1998; Apple originally had planned to offer DVD by the end of last year. For now, your only choice is CoolDVD, a \$499 Mac DVD upgrade kit from E4 (408/441-6060, [www.e4.com](http://www.e4.com)).

CoolDVD consists of an internal IDE-based DVD drive, software, and a single-slot PCI card, which is used to decode the DVD MPEG 2 video stream; the card also accepts audio input from the drive. The drive works with the Power Mac 4400, the new G3 desktops, and other Macs with IDE connectors; E4 plans to offer a SCSI version of CoolDVD by March. A second optional board provides outputs for S-Video, RCA analog audio, and SPDIF digital audio.

**A New Generation** E4 is using what's known as a second-generation DVD drive. The first generation of drives could read CD-ROMs, but not CD-R discs, including Photo-CD media. Current DVD drives support CD-R. And future DVD-RAM drives will be backward-compatible with all CD-ROMs.

The E4 package includes DVD player software that uses an interface similar to that found in the Apple CD Audio Player. You can control DVD movies as if you were using a stand-alone DVD player.

You also have access to unique, title-specific DVD features, such as parental restriction and the ability to choose different camera angles or alternative language tracks.

## graphics

## Merger Wave Hits Plug-in Publishers

RECENT MARKET TRENDS

FAVOR LARGER VENDORS

by Stephen Beale

**C**hanges are afoot among vendors of graphics extensions—Adobe Photoshop plug-ins, QuarkXTensions, and other products that add new functions to popular design programs.

On January 6, Extensis (503/274-2020, [www.extensis.com](http://www.extensis.com)) announced that it had acquired Astrobyte, publisher of the BeyondPress QuarkXTension, for creating Web pages from QuarkXPress documents. Two weeks later, the World Wide Power Company (303/940-0600, [www.thepowerco.com](http://www.thepowerco.com)) announced that its owner, Cyndie Shaffstall, along with Jim Jensen, president of GeneSys, had purchased XChange, a major distributor of QuarkXTensions that also publishes *X-Ray* magazine, for QuarkXPress users. The World Wide Power Company (WWPC) distributes plug-ins, QuarkXTensions, and other graphics products; GeneSys is a developer of database-publishing tools for the Web.

The timing of the acquisitions may be coincidental, but both point to the special challenges facing developers of graphics extensions—and could have implications for the availability of innovative new extensions in the future.

**Limited Resources** Photoshop plug-ins and other extensions have been a boon for con-

tent creators, because they offer a low-cost means of enhancing and customizing key design applications. Most plug-ins have come from small software developers—even solo programmers—that may have innovative product ideas but limited marketing and distribution resources.

To compensate, many have turned to outfits, such as XChange and the WWPC, that provide a central source for graphics utilities. XChange, founded in 1989, focused exclusively on QuarkXTensions and other Quark-related products. However, the company hit financial difficulties about two years ago and was heavily in debt at the time of the WWPC acquisition, Shaffstall says.

One QuarkXTensions developer, Dacques Viker, of Vision's Edge (904/386-4573,

black—about nine months from now, she hopes—she plans to merge its operations into her own, with a single set of offices in suburban Denver. Shaffstall is also seeking a publisher for *X-Ray*.

**A Different Approach** Extensis chose a different path to fortune. Beginning in 1994 with a single set of Adobe PageMaker add-ons—PageTools—Extensis used acquisitions, distribution deals, and its own software development resources to build a product line that now includes QX-Tools, QX-Effects, PhotoTools, VectorTools, Intelligence, Portfolio, PreFlight Pro, PreFlight Designer, MaskPro, BeyondPress, and its latest release, PhotoFrames. This gives Extensis an advantage over smaller extensions developers, since it can divide marketing costs and other overhead among a larger number of products.

In addition to bringing BeyondPress into the fold, the Astrobyte deal gives Extensis extra programming expertise in QuarkXTensions and Web publishing. You can thus expect to see more of both from Extensis, although the company has not yet announced any new products arising from the Astrobyte acquisition.

**Back in the Fold** Meanwhile, MetaCreations (805/566-6200, [www.metacreations.com](http://www.metacreations.com)), which last year said that it was getting out of the Photoshop-plug-in business, has had a change of heart.

Later this year, the company plans to release an upgrade to Kai's Power Tools, the package that launched the boom in Photoshop plug-ins. However, chief interface officer Frank Casanova says the company has not yet decided whether to release the upgrade as a plug-in, a stand-alone application, or both. Nor has Meta-

continues

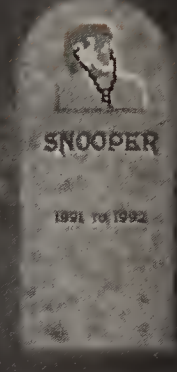
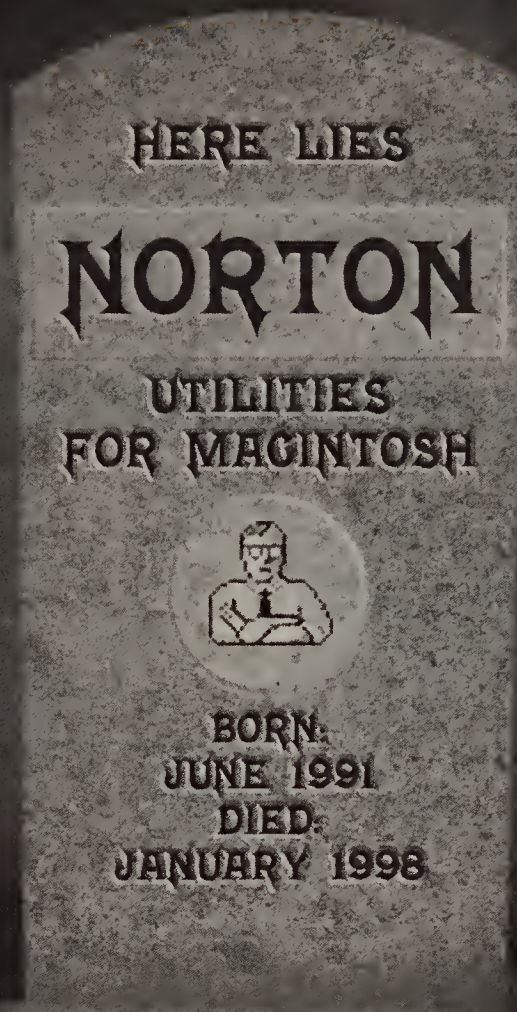


[www.xtender.com](http://www.xtender.com)), says that XChange fell behind in payments to some developers and failed to pay others at all. While XChange accounted for just 25 percent of his company's business, he says, other, smaller developers were almost completely dependent on XChange for their revenue.

Shaffstall says she plans to spend the next six months paying off XChange's creditors. Once XChange is back in the



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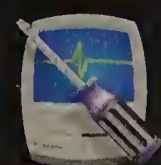
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Creations determined the fate of KPT Convolver, an image-enhancement plug-in introduced in 1995. MetaCreations also offers plug-ins for Adobe After Effects and Adobe Illustrator/Macromedia FreeHand.

**Implications** Extensis's acquisition of Astrobyte follows a general trend toward consolidation among graphics-software vendors. The big fear among users is that this will lead to fewer innovative products. However, Astrobyte founder Ralph Risch says the acquisition will spur innovation, by allowing him to focus on product development rather than marketing and other considerations.

Jeff Butterworth, founder of Alien Skin Software (919/832-4124, [www.alienskin.com](http://www.alienskin.com)), acknowledges that a relatively large vendor such as Extensis—whose PhotoTools competes with Alien Skin's Eye Candy—has marketing and distribution resources he can't match. Nevertheless, he believes there will always be a place for companies like his. "Bigger guys will keep swallowing smaller guys, but small guys will keep coming along," he says.

Shaffstall says she doubts that the Extensis/Astrobyte deal indicates a larger trend toward consolidation among

plug-in vendors. If anything, she says, the popularity of extensions has bigger implications for Adobe and Quark. Because plug-ins make it so easy to customize your software, she says, many users are hesitating before they upgrade Photoshop or QuarkXPress. As a result, she expects to see fewer revisions of major graphics packages.

#### multimedia

## FireWire Heats Up Digital Video

NEW PRODUCTS USE  
HIGH-SPEED INTERFACE

by Brooke Wheeler

**F**ireWire, the high-speed digital-bus interface also known as IEEE 1394, is igniting a new generation of authoring tools for digital-video producers. While Apple has been slow to incorporate FireWire into its motherboards—that's slated to happen by the end of the year—developers are rushing to market with digital-video systems that take

advantage of FireWire's blazing 400MBps transfer rates.

**Adaptec Connects** FireWire-based video-editing systems typically include a PCI card, FireWire cable, and QuickTime authoring software. Three vendors, ProMax (714/727-3977, [www.promax.com](http://www.promax.com)), Pinnacle Systems (650/526-1600, [www.pinnaclesys.com](http://www.pinnaclesys.com)), and DPS (606/371-5533, [www.dps.com](http://www.dps.com)), have unveiled systems based on Adaptec's new HotConnect Ultra 8945, which features three FireWire connectors and an Ultra Wide SCSI accelerator on a single board.

The \$695 FireMax-2, from ProMax, slated to ship in February, includes Adaptec software drivers and plug-ins for Adobe Premiere and After Effects. ProMax has also dropped the price of its original FireMax—based on Adaptec's single-port AHA-8940 PCI card—from \$595 to \$495.

Pinnacle Systems' \$799 miroVideo DV300 FireWire digital-video capture board includes Adobe Premiere LE for video editing and DVTools software for controlling digital camcorders. The forthcoming DPS Spark video-editing system, priced at \$999, will include a full version of

Adobe Premiere in addition to the new Adaptec card. German developer Octopos Systems (49-40-270965-0, [www.octopos.de](http://www.octopos.de)) is shipping the \$3,500 DV Studio 1394,



which includes a FireWire PCI card, external connector box, and Adobe Premiere.

**Radius Deals** At Macworld Expo in January, Radius (408/541-6100, [www.radius.com](http://www.radius.com))—one of the first companies to offer FireWire-based digital-video tools—announced a deal with Media 100 (508/460-1600, [www.media100.com](http://www.media100.com)) under which the latter will incorporate Radius technology into its video-editing systems. Media 100 will acquire distribution rights to EditDV, Radius's \$999 video-capture system, along with the PhotoDV FireWire card and MotoDV video-capture software.

**DV Cameras** As FireWire-based video-editing products hit the market, other vendors are keeping pace with DV camcorders that include FireWire interfaces.

Panasonic (201/348-7000, [www.panasonic.com](http://www.panasonic.com)) is shipping the \$2,000 PV-DV700 and \$2,500 PV-DV710 DV cassette camcorders. Canon (516/488-6700, [www.canondv.com](http://www.canondv.com)) is shipping the \$4,500 Canon XL1, the professional big brother to the \$2,500 Optura mini DV camcorder. In February, Sony Electronics (408/432-0190, [www.sony.com](http://www.sony.com)) plans to ship its lightweight \$1,000 DFW-V300 video camera.

## New Kodak Digital Camera Uses FireWire

FIREWIRE MAY BE A BOON FOR DIGITAL VIDEO, but it can also provide a speedy gateway for high-resolution still images. Eastman Kodak (716/724-1568, [www.kodak.com](http://www.kodak.com)) has built a FireWire interface into its new DCS 520, a \$15,000 digital single-lens reflex camera based on the Canon EOS.

Targeted at photojournalists, the camera captures 36-bit color images at 1,736-by-1,160-pixel resolution, producing a 6MB file. With files that big, a serial connection would be too slow, says Kodak product manager Gerard Magee.

Magee admits that Kodak is a bit premature in offering FireWire. When development began on the

new camera, the company expected that Apple would have its first Macs with built-in FireWire connections by the end of 1997; Apple currently plans to offer FireWire Macs by the end of 1998. Magee expects that many DCS 520 resellers will bundle the camera with FireWire interface boards.

In addition to the FireWire interface, the camera includes dual PC Card slots for removable storage and image transfer. It also features a burst rate of 3.5 frames per second, an ISO range of 200 to 1600, and a color LCD that shows a histogram of each captured image. Kodak expects to ship it in March.—MACWORLD STAFF



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Drive Bays	7 total/4 open	7 total/3 open
Total PCI Slots	6	6
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## "APPLE DELIVERS QUICKTIME 3.0"

*continued from page 23*

anonymous sources, has reported that Adobe plans a May 1998 release for Premiere 5.0, a new version of the company's digital-video-editing software. It's a safe bet that the

upgrade will support QuickTime 3.0.

**The Vector Shuffle** One new feature in QuickTime 3.0 is a vector-animation track; vector animations typically consume much less file space than equivalent bitmapped animations and are thus ideal for use on the Web. Lari Software (919/968-

0701, [www.larisoftware.com](http://www.larisoftware.com)) offers a \$99 program called LightningDraw/Web for creating QuickTime 3.0 vector animations. By spring, the company plans to release a more comprehensive package, Electrifier Pro, that produces bitmapped and vector animations in a variety of formats.

PaceWorks (415/261-6180, [www.paceworks.com](http://www.paceworks.com)) says it will support the QuickTime 3.0 vector track in a future version of its ObjectDancer animation software. But Macromedia says that Flash, its vector-animation program, will not write to QuickTime's vector format unless users demand the capability. Until recently, you needed the Shockwave Flash browser plug-in to view Flash animations; Flash animations in the QuickTime vector format would be viewable by anyone with the QuickTime plug-in. However, a new Xtra from Macromedia lets you export Flash animations as Java applets that can be viewed on any Java-capable browser.

**Deployment Far and Wide** One of QuickTime's strengths is its transparent support for a wide variety of digital media types. This makes it a good vehicle for delivering content over the Internet; with the latest version, you can stream audio and video without requiring users to keep a closetful of browser plug-ins. But for QuickTime 3.0 to succeed as an Internet technology, a critical mass of users—including those on the PC side—must install the software.

Apple expects that many Macintosh users will download the upgrade from the Web; QuickTime product manager Mitchell Weinstock estimates that as of January, 1 million users per month were downloading QuickTime 2.5. But given QuickTime's file size of 5MB to 6MB, many will no doubt balk at such a bandwidth-chewing download. So Apple is also counting on CD-ROM-title developers to pollinate desktops with the upgrade. Weinstock figures that every PC sold these days includes at least one title created with QuickTime; install the title and you also get the Apple software.

## What's New in QuickTime 3.0

NEW FEATURES IN QUICKTIME TRANSLATE into new capabilities for multimedia and digital-video-production tools. Here's some of what you can expect to see in authoring programs that support QuickTime 3.0:

**A Better Codec** With QuickTime 3.0, Apple has licensed compression/decompression (codec) technology from Sorenson Video; Sorenson Video is now QuickTime's default codec. It's faster and offers better video quality than Cinepak, the default codec in previous versions of QuickTime. However, if movies are compressed with Sorenson Video, you'll need to install QuickTime 3.0 to view them. Cinepak remains in QuickTime 3.0 for backward compatibility, and the Apple software supports other codecs as well.

**Audio Connections** Apple has signed a series of technology-licensing deals that extend QuickTime's audio capabilities: voice-compression software from Qualcomm, a music codec from QDesign, and a pair of MIDI applications from Roland. Roland's Sound Canvas provides QuickTime with 128 built-in MIDI instruments; GS Format software adds support for Roland's GS technology, an enhancement to the basic MIDI specification.

**Down the Stream** Seeking to improve QuickTime's appeal as an Internet standard, Apple has added streaming-audio and -video capabilities, which allow a movie to begin playing as it is being downloaded. You can also tie multiple-resolution versions of a QuickTime movie to a single link, sending the version most appropriate for the browser's data rate. Unlike with other streaming-media technologies, such as RealNetworks' RealAudio, you don't need special server software; you put the QuickTime movie on your Web site, and the movie automatically streams when downloaded.

Early demonstrations with QuickTime's new video and audio codecs indicate excellent sound and image quality. However, if you want to pro-

duce a live Webcast in which the audio and/or video streams in real time, you'll need one of the competing server-based streaming technologies.

**Vector Animation** A new vector-animation track lets you create animated logos, text treatments, and other effects in small file sizes ideal for use on the Web. Lari Software supports QuickTime 3.0 vector animation in LightningDraw Web; PaceWorks says it will support the format in a future version of ObjectDancer.

**New Formats** QuickTime 3.0 adds several new media types to an already long list of sup-



ported formats. These include the DVCAM format for digital-video cameras, which allows QuickTime applications to work directly with DVCAM video streams.

Previous versions of QuickTime supported two flavors of Motion JPEG; QuickTime 3.0 adds support for OpenDML M-JPEG and Avid Video Resolution M-JPEG.

**Video Effects** A new video-effects architecture allows developers to create filters that can be applied in real time to QuickTime movies. For example, you can add an emboss effect to give the illusion that video frames are etched in stone.

**Cross-Platform Parity** QuickTime 3.0 is the first fully cross-platform version of QuickTime. Previously, QuickTime for Windows was limited to movie playback; now you can also create QuickTime content under Windows.



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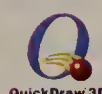
### 2D Performance Comparison - MacBench '98

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MacBench 4.0 HR+ Plus using Mac OS. Tested on PowerMac G3 233MHz/32MB RAM. All boards have 8MB. Test mode: 1152 x 870 x 75Hz. 32bpp. Tested using Driver Versions: Nexus 1.1 / iXMICRO Twin Turbo 4.0.2 / Matrox Millennium 2.10.

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# Reviews

## Personal Image Editors

BEGINNERS WITH AGING

HARDWARE NEEDN'T APPLY

**I**F YOU'RE LIKE MOST FOLKS, YOU take your snapshots to the cheapest lab you can find and rely on the photographic equivalent of a fry cook to churn out your precious memories as fast as you can say, "Shouldn't the sky be blue?" Fast photos have their place, but wouldn't it be great if you could be in control of your own digital darkroom? You could select the best shots, balance the colors, sharpen the details, and crop away the extraneous background stuff that you didn't mean to photograph in the first place. No more apologizing about the one where your finger got in the way—every photo would be picture-perfect.

For the uninitiated, the thought of operating a digital darkroom may be a bit intimidating. Armed with the proper software, however, a reasonably intelligent person should be able to figure it out. That's where the latest round of personal image editors comes into play. MetaCreations' Art Dabbler 2.1.1, The LivePix Company's LivePix 1.1, and Adobe's PhotoDeluxe 2.0 are all designed to help the burgeoning electronic shutterbug correct and experiment with pixel-based photos. Any of the three can be yours for \$49, and both LivePix and PhotoDeluxe are bundled with many brands of digital cameras. Also encouraging, each of the companies produces a professional-level editing tool—Painter, Live Picture (a product of LivePix's parent company),



and Photoshop, respectively. But that's where the similarities end; the three products take very different approaches, with varying degrees of success.

### Dabbler Makes New Demands

Art Dabbler is more an image *enhancer* than an image editor. Like Painter, it offers a host of natural-media tools and paper textures for embellishing your photographs. If you get particularly ambitious, you can integrate a string of photos into a simple flip-book animation. But the feature of most interest to digital-camera buffs is cloning: Art Dabbler lets you take

any tool and use it to paint an image onto a blank canvas. With only a modicum of drawing experience, you can convert a photograph into a pencil sketch, a charcoal drawing, or an impressionistic painting. It's a lot of fun, and the results can be downright charming.

I do have two complaints about Art Dabbler. First, its outrageous hardware requirements exclude many of the artistic novices it's meant to appeal to. While its predecessor, Dabbler 2.0, cost \$20 more, it ran speedily on a 68030 Mac and required just 4MB of application RAM; Art Dabbler requires a Power Mac and a

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GOOD: ★★★

FLAWED: ★★

UNACCEPTABLE: ★



staggering 12MB of application RAM. This might be OK if your more-powerful hardware bought you access to more-powerful features, but it doesn't—Art Dabbler 2.1.1 is functionally identical to Dabbler 2.0. The CD comes with some extras, including plug-ins from the Kai's Power Tools collection, but not so much as a single command in the core application has changed.

Second, Art Dabbler isn't much more than a subset of Painter. Its only unique features are the online guides adapted from the old Walter Foster drawing library. As a proud owner of the original *Animation* book by Preston Blair—the Disney artist who created the dancing hippos in the movie *Fantasia*—I'm partial to these online adaptations (see “Back to Basics”).

However, I would have welcomed a few more features catering specifically to beginning artists.

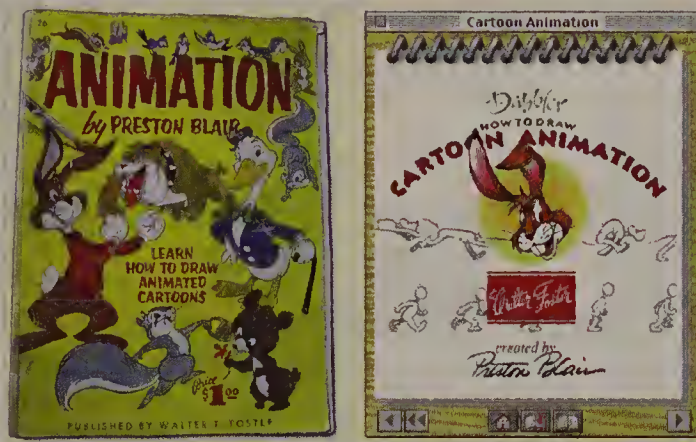
None of which is to say that Art Dabbler isn't worth \$49; even a subset of Painter's capabilities makes for a pretty nifty program. Still, I can't help but imagine what MetaCreations' clever programmers could have done with Art Dabbler if they had tried harder to remember how it felt when they learned to draw.

### Night of the Living Pix

If Art Dabbler is more of a painting program than an image editor, LivePix is more of an illustration program. LivePix lets you merge and edit images inside an independent project file, ensuring that you never harm a pixel of the original images. Every image in the project is treated as a separate object, selections are defined as point-by-point paths, and a line of text remains editable from one session to the next. When it saves the finished composition as an image file, LivePix rasterizes the images at a new resolution.

In short, LivePix is a miniature version of Live Picture. But while this object-oriented approach makes sense for editing large images—say, more than 10MB—it actually slows down the process of editing 1MB digital-camera files. When you import an image into your project, LivePix generates an interpolated proxy so the image looks its best on screen. Any time you zoom in or out,

LivePix has to redraw each and every object to produce a smooth screen preview. If you select a portion of an image and then paste it into the project, LivePix treats the selection as an editable clipping path so you can mask or unmask portions



**Back to Basics** I spent my formative years pawing Preston Blair's original *Animation* guide (circa second grade, left), so naturally I'm all for the electronic edition built into Art Dabbler (right). Otherwise, Art Dabbler is merely a subset of Painter's capabilities.

of the original image later. This makes for a lot of heavy-duty computations. On a PowerPC 750 machine, a typical composition with six or seven elements routinely takes 30 seconds or more to display on screen, compared with a second or two in a standard image editor.

If all of this strikes you as a bit complicated for a \$49 consumer application, you've anticipated my next complaint: Most professional artists have a hard time figuring out Live Picture, and LivePix in its own small way is every bit as obtuse. Here's a program that's bundled with such entry-level products as Panasonic's Cool-Shot camera and Epson's Stylus Photo printer, yet it requires a Power Mac and 20MB of application RAM. (For what it's worth, I encountered frequent low-memory errors until I raised the memory partition to 24MB.) LivePix suppresses the standard Macintosh scroll bars, requiring you to switch to a hand tool when you want to scroll. Meanwhile, you can't access the hand tool from the keyboard, an ease-of-use convention that dates back to MacPaint. Drag-and-drop support is limited to applications that support OLE 2.0, thus ruling out the Finder and just about every mainstream program without the word *Microsoft* in its title. Although LivePix is object-dependent, there's no way to examine the stacking order of objects in a palette—making the program *harder* to use than Live Picture in this respect.

Finally, LivePix has a known conflict with Mac OS 8.0: if the System-Wide Platinum Appearance option is active, LivePix crashes during start-up. The upshot is that while LivePix might seem a real bargain to a proficient artist—you can buy 80 copies of LivePix for what it cost to buy the original Live Picture—I had an easier time getting to first base with Photoshop. It's hard to imagine a product less suited to the needs of weekend image editors.

### Shedding Light on the Darkroom

While PhotoDeluxe draws freely on Photoshop's capabilities—many of its filters are lifted directly from the image editor cum laude—PhotoDeluxe manages to go its own way in no uncertain terms. Although I don't altogether agree with its approach, PhotoDeluxe makes considerable efforts to meet the needs of first-time pixel polishers.

Like LivePix, PhotoDeluxe offers a gallery feature to help you organize your images. (With a gallery, you can pick and choose from hundreds of images displayed as thumbnails.) But unlike LivePix, PhotoDeluxe launches a separate program, Storm Technology's EasyPhoto, every time you access the gallery. The good news is that EasyPhoto is substantially more capable than LivePix's gallery feature. To add an entire folder of images to the gallery, you just drag the folder from the Finder and drop it into EasyPhoto; in LivePix, you must laboriously load an image at a time. The bad news is that the interaction between PhotoDeluxe and EasyPhoto is a bit clumsy. By default, EasyPhoto wants to save its galleries to one folder, and PhotoDeluxe insists on opening them from another. If you're a novice, this design quirk makes for considerable confusion.

When it comes time to edit images, PhotoDeluxe holds your hand and walks you through the process (see “Magical Pixel Tour”). Imagine a Microsoft-type wizard that doesn't treat the user like a mindless dweeb, and you have an idea of how PhotoDeluxe works.

Say you want to remove a telephone line that drops down into your otherwise gorgeous sunset picture. When you click on the Remove Elements button, PhotoDeluxe displays three index cards presenting three steps: select the offending phone wire, clone it away, and exit the



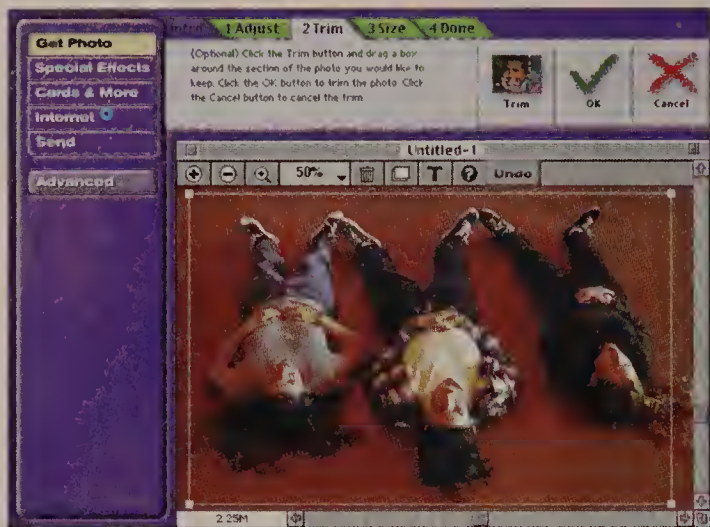
Remove Elements mode. Not only are the steps as easy as pie, but the selection and cloning tools actually surpass their equivalents in Photoshop for sheer usability. And it's entirely up to you if you want

its hardware requirements, but even its minimum requirements of a 68040 with 16MB of RAM place it well outside the reach of many home users.

But enough ranting. If you have the hardware, Art Dabbler is a diverting tool for enhancing your digital scrapbook, and PhotoDeluxe is a fine introduction to the world of image editing. My only concern is that both programs have relatively low feature ceilings.

If you're the kind of person who catches on pretty quickly, you're likely to get frustrated with Art Dabbler and PhotoDeluxe after about a year. For \$49, a year of use is a pretty reasonable deal. But if I were just starting out, I would go with the \$149 Color It 3.2 from Micro-Frontier (see "Tweak It," November 1997). It's more

expensive, but it's also several times more powerful than PhotoDeluxe and runs on a 68030 processor with just 2MB of RAM. Now *that's* what I call a low-end image editor. —DEKE MCCLELLAND



**Magical Pixel Tour** If you so desire, PhotoDeluxe will walk you through every process step-by-step. Here, I've asked PhotoDeluxe to help me crop an image down to its most essential elements—namely, the three kids looking up at the fireworks.

to perform the steps or not. PhotoDeluxe gives you a leg up, but you're always the one in control.

PhotoDeluxe gets big points for ease of use, but I wish I could do more with it. There's no way to lighten or darken the medium colors in an image (the so-called *gamma*), making it almost impossible to correct brightness properly. And when sharpening the focus of an image, you have no control over the intensity of the effect. Both of these exceedingly important operations could have been handled very simply without burdening novices with unintelligible controls.

### Macworld's Buying Advice

At the risk of sounding like a grizzled old curmudgeon, I must say that I remember a time when programmers took special care to make their software compatible with low-end machines. As late as 1992, for example, every major graphics program listed the Mac Plus—by then seven years old—as its minimum system requirement. Today, even \$49 consumer products refuse to run on a four-year-old Quadra. Let's face it, there's simply no excuse for the fact that Photoshop runs just peachy on a PowerBook 540c, but Art Dabbler and LivePix—which are perhaps 10 percent as capable—won't even launch. PhotoDeluxe is considerably more realistic in

## SECOND LOOK

# QuickMail Office 1.0.2

UPDATE PLUGS SECURITY HOLES

**O**UR RECENT REVIEW OF QUICK-Mail Office 1.0 (see *Reviews*, February 1998) reported two serious security problems, along with CE Software's promise to fix those problems in an upcoming release. After posting a temporary fix to its Web site to mitigate some of the security risk, CE in mid-January released version 1.0.2, with complete fixes for all known security problems. In addition to these fixes, the update adds several useful functional and performance enhancements.

A new set of TCP/IP security preferences resolves the security hole that let outsiders reprogram mail filters remotely via e-mail messages; you can list the specific IP addresses that can change filters remotely, preventing abuse by outsiders. A second security problem let junk-mail distributors use a QuickMail Office server as a relay station to pass junk mail to other networks. A new set of controls patches that hole by limiting mail relaying to a list of domain names and IP addresses you specify. In addition, this version improves the filters' overall security by sending alert messages when it detects attempts to breach security.

Functional enhancements include the ability to list subsets of users in list windows, locate users in a list by typing their first names, and initiate mail retrieval by using the Unix "finger" protocol. Performance improvements speed up mail processing significantly and increase the number of attempts the server makes when delivering mail to offline users.

**Macworld's Buying Advice** CE Software responded quickly and responsibly to our report of security problems, and our testing found version 1.0.2's fixes very effective at blocking server attacks by outsiders. This update makes QuickMail Office a first-rate Internet mail server. —MEL BECKMAN

## Art Dabbler 2.1.1

**RATING:** ★★★ **PROS:** Turns photos into painterly artwork; includes online drawing guides. **CONS:** Excessive hardware requirements; little more than a subset of Painter's capabilities. **COMPANY:** Meta-Creations (805/566-6200, [www.metacreations.com](http://www.metacreations.com)). **LIST PRICE:** \$49.

## LivePix 1.1

**RATING:** ★★ **PROS:** No chance of harming original image files; fully editable text. **CONS:** Excessive hardware requirements; poky screen redraw; complicated, awkward interface; OS 8 conflict. **COMPANY:** The LivePix Company (415/908-1067, [www.livepix.com](http://www.livepix.com)). **LIST PRICE:** \$49.

## PhotoDeluxe 2.0

**RATING:** ★★★ **PROS:** Flexible gallery feature; walks novice users step-by-step through image manipulation. **CONS:** Limited capabilities; intermittent interface display problems. **COMPANY:** Adobe Systems (408/536-6000, [www.adobe.com](http://www.adobe.com)). **LIST PRICE:** \$49.

**RATING:** ★★★ **PROS:** ETRN, for nondedicated server connections; POP3 bridge; list server; client-setup wizard; fax and pager gateways. **CONS:** Weak remote administration; requires PowerPC computer. **COMPANY:** CE Software (515/221-1801, [www.cesoft.com](http://www.cesoft.com)). **LIST PRICE:** Five users, \$380; 25 users, \$1,200; 100 users, \$4,000.



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**Circle 15 on reader service card**



# PowerBook G3

SPEED CHAMP NEEDS TWO HANDS, TOO MUCH MONEY

**D**ESPITE COMPETITION FROM the PC-laptop world, Apple Computer still makes the fastest laptop on earth: the PowerBook G3. By a happy coincidence, the speedy PowerPC 750 chip inside Apple's popular G3 desktop machines gives off very little heat, making it a natural for use in a laptop. The resulting PowerBook is identical to the heavy, luxurious PowerBook 3400 (see *Reviews*, May 1997) in

PowerBook blow past its predecessor—and all of its Pentium rivals.

The G3 comes decked out with top-of-the-line extras. The 5GB hard drive ought to keep Adobe Photoshop gurus happy for a while (especially since it's 38 percent faster than previous PowerBook drives). The 20× CD-ROM is also a bump up from past offerings (although the "X" number is mostly meaningless—commercial discs are generally mastered to play on 4× drives, max). According to Apple, the PowerBook G3's glorious 12.1-inch screen updates itself 74 percent faster than the PowerBook 3400's, and there's more video RAM—enough to fill an 832-by-624-pixel monitor at the "millions of colors" setting or a 1,024-by-768 screen at "thousands."

Otherwise, the PowerBook G3 is the same as the 3400, warts and all. You still can't display a different image on an external monitor, and even with all that VRAM, you can't set the PowerBook's own screen to anything higher than "thousands of colors." You still get four speakers, a two-hour battery, and an ingenious Ethernet/33.6-Kbps-modem jack that accepts whichever connection you plug in: 10BaseT cable or phone line. And as before, you can exchange the floppy drive and CD-ROM unit—plus VST Zip drives (see the review elsewhere in

this issue) and other add-ons—without having to put the laptop to sleep.

## Macworld's Buying Advice

Faster than most desktop Macs, this laptop requires little lowering of expectations; once it's in front of you on a sturdy-legged table, using this machine is pure joy. Productivity applications—even Microsoft Office 98—launch nearly instantaneously, Web pages appear as fast as they download (despite the built-in modem's lack of 56.6-Kbps speed), and even games get a kick from this high-horsepower multimedia deck.

But the G3 is a behemoth; at 8 pounds (with CD-ROM and power plug), lugging this thing around is like hauling a barbell in your briefcase. If you've ever handled Apple's sleek, ultralight winner, the PowerBook 2400c, you'll find that the requirement to lift the G3 with two strong hands is especially disappointing.

And then there's the price: you'd be nuts to pay \$5,700, especially when sources are saying that one of Apple's new PowerBooks, slated for April, will offer the same speed, a slimmer case, a larger screen, a faster modem, and a battery with longer life—for \$2,000 less. (See "New Laptops on Course," *News*, March 1998.) In other words, owning a PowerBook G3 is highly recommended, but *buying* one isn't.—DAVID POGUE



GIBSON

every respect except one: the PowerBook G3 is nearly twice as fast.

How can this be? After all, the G3's official megahertz rating is "only" 250 (compared with the PowerBook 3400's 240MHz rating). But the new model's faster circuitry, bigger/faster/closer high-speed memory cache, and superior PowerPC 750 design make this new

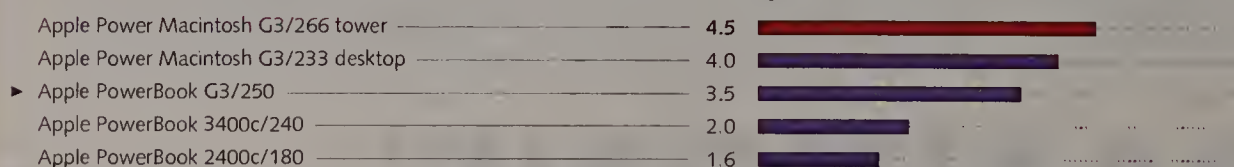
**RATING:** ★★★ **PROS:** Awesome speed; bright 12.1-inch screen; built-in Ethernet/modem jack. **CONS:** Heavy; limited video features; too expensive. **COMPANY:** Apple Computer (408/996-1010, [www.powerbook.apple.com](http://www.powerbook.apple.com)). **LIST PRICE:** \$5,700.

## Macworld LAB TEST

### PowerBook G3: Apple's Speediest Portable Yet

■ Best overall performance. Longer bars are better. Bold indicates best results in a specific test. ► New system. An Apple Power Macintosh 7100/80 has a SpeedMark score of 1.0.

#### SpeedMark



CPU	FPU	Disk	Video
5.0	4.7	2.9	7.1
4.5	4.1	2.5	6.7
3.9	3.9	2.3	4.1
2.1	2.1	1.6	2.3
1.7	1.7	1.3	2.1

#### Behind Our Tests

For detailed information on our systems benchmarks, see *Mac Superguide*, September 1997, or [www.macworld.com/tests/](http://www.macworld.com/tests/).—Macworld Lab testing supervised by Gil Loyola





This EPS image was printed on an inkjet **without** StyleScript



This EPS image was printed on an inkjet **with** StyleScript

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# Dreamweaver

DYNAMIC HTML NO LONGER JUST A DREAM

**T**HE NEW DYNAMIC HTML technologies supported by Netscape Navigator 4.0 and Microsoft Internet Explorer 4.0 offer some exciting new capabilities—cascading style sheets, absolute positioning, and JavaScript-based animation, to name a few—but they require a lot of complicated programming. Macromedia's Dreamweaver 1.0 is the first major program that lets you use DHTML while shielding you from its underlying complexities. Dreamweaver's design capabilities and respect for clean HTML should bring smiles to the faces of designers and code geeks alike.

## DHTML Dynamo

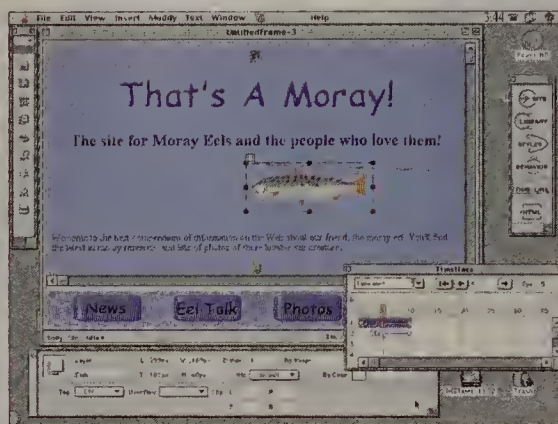
In Dreamweaver you create DHTML animations by placing text and images on movable layers that can fly across the screen. You can then manipulate those layers in a Timeline Inspector reminiscent of that in Macromedia Director. The program includes several *behaviors*, canned JavaScripts that automate common tasks. Adding behaviors is easy: you simply select text or an image and choose the desired behavior from a palette, and Dreamweaver adds the appropriate JavaScript to the page. If you know how to program in JavaScript, you can create your own behaviors.

Dreamweaver provides very good support for cascading style sheets. You can define text styles that can then be used throughout your document, or you can create external style sheets that are referenced by all pages in your site; changing a style definition automatically changes all instances of that style.

While other programs position text and images precisely on a page by creating complex tables, Dreamweaver uses the much cleaner DHTML absolute positioning. But because absolute positioning works only in version 4.0 browsers (which fewer than half of Internet users have), it's easy to create pages that look great in current browsers and awful in last year's model. And aside from its DHTML features, Dreamweaver isn't as capable a design tool as competitors like GoLive's CyberStudio or NetOb-

jects Fusion; in this respect it bears a closer resemblance to the simpler Claris Home Page.

One nice feature in Dreamweaver is Roundtrip HTML: you can edit a page either graphically or in the HTML source code, without having the graphic editor rewrite changes made in the HTML source code as competing programs do. Compared with other programs, Dream-



**New Arrivals** Dreamweaver's animation support brings a Director-style Timelines window to Web-page design. Each image in the top frame is flying into the frame under the timeline's control.

weaver generates tight, clean HTML that's easy to edit by hand. A good HTML source editor is built in, as is Bare Bones Software's BBEdit 4.5. Buttons in both programs let you bounce back and forth easily between the two.

In an attempt to generate pages that work in most browsers, Dreamweaver writes extra HTML and JavaScript that takes into account the differences between Navigator and Internet Explorer. Most of the time the program succeeds admirably at this difficult task; it checks your pages' syntax against browser profiles and generates a report listing the features of your site that will cause errors.

## The Wrong Tool for Site Architects

Dreamweaver is good at building pages but weak when it comes to building sites. Unlike CyberStudio and Fusion, it offers minimal site-management capabilities; it simply maintains a site on a local drive that's an exact duplicate of the site on the remote server, checking the server periodically for changes. If you accidentally break a link, Dreamweaver won't help you

find it or fix it automatically. And clicking on a link to another page in your site—a good way to check links—doesn't open that page. In addition, the program lacks a graphical site overview showing links between pages.


On the other hand, Dreamweaver has an innovative system for managing group collaboration on a Web site, something that's notably missing in competing programs: it locks files that a user has "checked out," preventing someone else from changing them at the same time. That keeps, say, an art director from modifying a page to which a coder is adding JavaScript behaviors.

Dreamweaver's performance is fine in some areas but mediocre in others. The Site window, for example, shows both the remote and local copies of a site, so every time you open a local page there's a delay while Dreamweaver checks the remote site for changes. The program is also a bit of a RAM hog, asking for 17MB of memory (although 20MB is preferable).

As a complex, professional-level tool, the PowerPC-only Dreamweaver requires significant time to master. Getting up to speed would be easier if the printed documentation were better—the skimpy user manual is accompanied by HTML and Shockwave help files that are extensive but lack an index. The program also needs some interface refinement: the array of palettes can be bewildering, and you often need to open several dialog boxes to complete a task.

## Macworld's Buying Advice

Dreamweaver's debut kicks off the next round of competition in the field of high-end Web page editors. If you've been looking to add DHTML to your sites but want to avoid the complexity of style sheets and JavaScript, Dreamweaver is a good choice. Just remember that if your users don't have the latest browsers, many of Dreamweaver's flashy effects will be for naught.—TOM NEGRINO

**RATING:**  **PROS:** Supports Dynamic HTML; excellent access to underlying HTML; includes BBEdit 4.5. **CONS:** Poor site management; needs better documentation; RAM hungry; quirky interface. **COMPANY:** Macromedia (415/252-2000, [www.macromedia.com](http://www.macromedia.com)). **COMPANY'S ESTIMATED PRICE:** \$499 (\$299 through February 28).





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# Midrange Digital Cameras

KODAK PROVES THE BEST OF A GOOD SUB-\$1,000 BATCH

IF NOTHING ELSE, *MACWORLD*'S first roundup of digital cameras for 1998 proves that there's no reason to put up with 640 by 480 pixels anymore. Of the four models discussed here, three sport an image resolution of at least 1,024 by 768 pixels (equivalent to the default resolution of a 19-inch monitor), and just one, the Panasonic CoolShot KXL-601A, tops out at 640 by 480 pixels (13-inch resolution).

Yet despite the fact that the CoolShot provides fewer than 40 percent as many pixels as its competitors, its estimated street price of \$599 is just \$100 less than that of the first of the high-resolution models we'll look at, the Olympus D-320L. And for \$300 more than the CoolShot, you can purchase the Kodak DC210 with its brilliant array of 1,152 by 864 pixels (just shy of the resolution of a 21-inch monitor). Granted, \$300 is nothing to sneeze at, but if you consider the price per pixel, the DC210 costs less than half as much as

the CoolShot—and those cheaper pixels are in a heck of a lot better shape!

## One of Q's Lesser Efforts

In the spirit of getting on with the good stuff, I'll dispense with the worst of the cameras first. The CoolShot KXL-601A is actually two pieces of hardware: a pocket-size camera unit (sold separately for \$399 as the KXL-600A) and a detachable LCD viewfinder. On its own, the KXL-600A looks like the sort of sleek platinum spy camera that the fictional gadgetmeister Q might have created for James Bond. But after a few hours of beta testing on the bad guys, 007 would have found plenty to beef about. The camera combines a wretchedly inaccurate viewfinder with poor image quality. It lacks a flash, but it's utterly incapable of taking pictures under low-light conditions.

And although the CoolShot is too dumb to automatically account for dramatic variations in light and focus, it's

smart enough to scold you when you fail to anticipate the variations manually. I'd hate to be in Q's shoes when James returns from "The Beepy Camera Mission."

The KXL-601A's LCD attachment addresses the inaccurate viewfinder problem, but it also doubles the camera's dimensions and weight. Without the LCD, the CoolShot is elegant but inept; with the LCD, it's just plain clunky. As a final snub, Panasonic assumes you own a PC. If you want to attach the CoolShot to your Mac, you'll need to purchase the special KXL-D43 interface kit. For \$59, you get a cable and a floppy disk. Not even archvillain Jaws gouges that deep!

## Pick a Camera, Any Camera

In stark contrast to the CoolShot, the remaining devices are easily the three best digital cameras under \$1,000 that I've seen. Naturally, each camera has its own peculiar quirks, but it's no exaggeration to say that you can't go wrong with any of them. The Kodak DC210 earns the highest mouse rating, thanks to its superior image quality, but if you find a good deal on the Olympus D-320L or Epson PhotoPC 600, then by all means, purchase without hesitation.

## Digital Cameras Under \$1,000

Company	Epson America	Kodak	Olympus America	Panasonic
Product	PhotoPC 600	DC210	D-320L	CoolShot KXL-601A
Mouse rating	★★★★	★★★★½	★★★★½	★★
Estimated street price	\$699	\$899	\$699	\$599
Phone number	310/782-0770	716/726-7260	516/844-5000	201/348-7000
Web address	www.epson.com	www.kodak.com	www.olympus.com	www.panasonic.com
Dimensions (w × h × d, in inches)	5.6 × 2.8 × 1.9	5.2 × 3.2 × 1.9	5.0 × 2.6 × 1.8	1.0 × 5.3 × 2.7 (1.9 wide with LCD)
Weight (with batteries, in ounces)	13	15	12	7 (13 with LCD)
Maximum image size (in pixels)	1,024 × 768	1,152 × 864	1,024 × 768	640 × 480
Default memory	4MB	4MB	2MB	2MB
Expandable media format	CompactFlash	CompactFlash	SmartMedia	CompactFlash
Maximum storage capacity (in images)**	16	19	10	24
Closest focal distance (in inches)	8	8	8	5
Optical zoom function	no***	yes (2×)	no	no
Built-in flash/red-eye setting	yes/no	yes/yes	yes/yes	no/no
LCD preview and playback	yes	yes	yes	optional
Optical viewfinder	yes	yes	yes	yes
Adobe Photoshop acquire module	no	yes	yes	no
Rechargeable batteries with charger	yes	no	no	no
Macintosh connectivity	yes	\$25 extra	yes	\$59 extra

\* Expandable media; no on-board memory. \*\* Maximum image size, medium quality. \*\*\* 3× digital zoom only.



The Olympus D-320L and Epson PhotoPC 600 are equivalent in a half-dozen respects. For starters, both cameras capture sharply focused, highly saturated images measuring 1,024 by 768 pixels. In fact, photographs taken with the two cameras are virtually indistinguishable, tending toward slight yellow casts. Both cameras include an attached lens cover, minimizing your need to clean the lens. To turn the camera on, just open the lens cover and away you go. And both cameras include Macintosh cables and software as part of the base package.

But the PhotoPC 600 offers a handful of noteworthy advantages over the D-320L. First, the PhotoPC 600 includes 4MB of on-board memory with optional expansion via CompactFlash cards (essentially miniature PC Cards). By contrast, the D-320L ships with 2MB of memory on a wafer-thin SmartMedia card that you have to swap out to expand. The PhotoPC 600 offers more compression options than the D-320L, and it's the only mid-range camera that lets you shoot both in color and in black-and-white. In terms of camera controls, the PhotoPC 600 remembers its settings from one session to the next, something neither the D-320L nor Kodak's DC210 does.

Another distinction is power. Epson bundles four rechargeable NiCd batteries and a compact charger with the PhotoPC 600; the other cameras ship with single-shot disposables. To make sure your batteries last a long time between charges, PhotoPC employs a more deliberate LCD design. You slide a switch to activate the LCD screen, compared with pressing a button on the D-320L. This may sound like a minor distinction, but it means the D-320L's LCD has a habit of turning on by itself and wasting precious battery power every time it's pressed up against another object in your camera bag or briefcase.

### King of the Midrange Pack

Last year, I was one of the very few voices critical of Kodak's previous effort, the DC120 Zoom (*Reviews*, October 1997), and the excellent performance of the DC210 confirms my criticism. Kodak's new camera isn't merely more stable than its predecessor, it's redesigned from the ground up. Where the older DC120 captured images to an 850-by-984-pixel CCD and then interpolated the



**Still Life with Blowout** Although I photographed this tire early one winter afternoon, the light was sufficiently low to set off the automatic flashes on all cameras but the CoolShot (A), which has no flash. The DC210 (B) produced the most vivid image, with the D-320L (C) and PhotoPC 600 (D) serving up slightly more muted colors. All three cameras did a great job of conveying the depth of the elements and the frayed edges around the tubing. The only washout among these images is the CoolShot's, which appears murky and irregular.

data horizontally to 1,280 pixels wide, the DC210's improved CCD captures a full 1,160 by 872 pixels and crops away the edges. The result is a crisper, sharper, and more colorful photograph without any of the grain associated with DC120 snapshots. In fact, the DC210 produces what are without a doubt the best images of any digital camera under \$1,000 (see "Still Life with Blowout").

The DC210's other specs are interesting if not exceptional. With the DC210, Kodak has forsaken the boxy design of the DC50 and DC120 in favor of an upright housing. And it's alone among the four cameras reviewed here in providing a continuous optical zoom. (The PhotoPC 600 provides a stepped 3× zoom, but it's merely an interpolated digital effect similar to what you'd get by upsampling in Adobe Photoshop.) On the downside, Kodak's LCD preview is, as usual, grainy and jerky when compared with the picture-perfect screens built into the D-320L and PhotoPC 600. And the DC210 lacks a lens cover, making it easy to gum up the lens with fingerprints and the like.

### Macworld's Buying Advice

If image quality is your main criterion, then Kodak's DC210 wins hands down,

not only among the four cameras reviewed here but among all 26 consumer models I've used in the past four years. If image quality is high on your list but usability is job number one, then I'd have to recommend Epson's PhotoPC 600. In fact, on a recent occasion when I needed to shoot some emergency pictures and deliver them in a hurry, I automatically grabbed the PhotoPC 600 for its splendid LCD preview, settings memory, and 4MB image capacity. The D-320L is no slouch, and at \$200 less than the DC210 it's obviously the most economic choice.

Incidentally, before you walk into your neighborhood camera or computer store, you might want to jot down the exact model names and numbers of the cameras you're interested in. Olympus produces lesser cameras with D's and L's in their names, and Epson's previous PhotoPC incarnations bear virtually no resemblance to the much-improved 600. (To make things additionally confusing, Olympus recently announced its own "600" model—the \$1,299 D-600L SLR zoom camera—which we'll review in a later issue.) Meanwhile, Kodak's other DC models—particularly the DC120—leave much to be desired.—DEKE MCCLELLAND



# Tax-Preparation Software

MACINTAX AND KIPLINGER TAXCUT CALM TAX ANXIETY

**T**HIS YEAR'S BIG TAX-LAW CHANGES can save you money, but they'll also complicate your filing chores. Fortunately, this year's tax-prep software, Intuit's MacInTax Deluxe and Block's Kiplinger TaxCut, have kept up with the new laws and help you understand how to save money for current and future tax years. Both programs use similar methods of asking you questions and filling in dozens of tax forms based on your answers. But MacInTax proves to be easier to learn, with its helpful method of collecting tax-code information, intense interview process, and simpler techniques for correcting errors.

## A Less Taxing Procedure

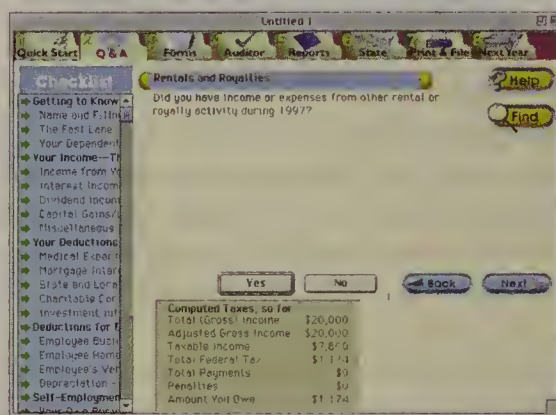
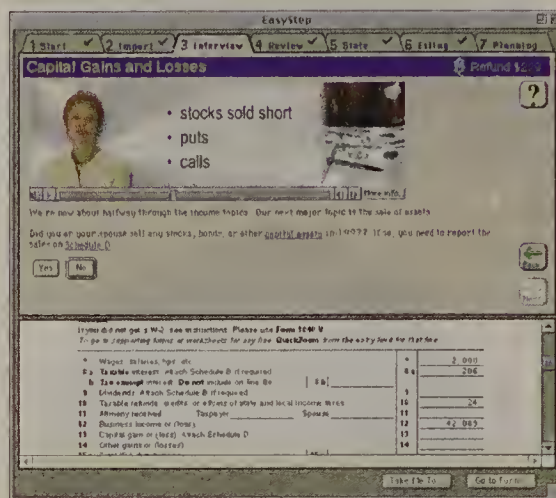
Both programs gather information by interviewing you. The interview question and answer fields appear in the top part of the screen, and tax worksheets appear underneath. Advanced users can always skip the interview and enter directly on tax worksheets. (Luckily, you don't have to type everything in, as both import data from Quicken and other financial software.)

Although both products use overview windows to jump from one major topic heading to another, MacInTax gives you more viewing room by keeping its overview window hidden—it's accessible via a button when you need it.

Since both programs calculate your taxes in a few seconds, be prepared to spend most of your time answering the interview questions. Occasionally, TaxCut's questions aren't as thorough or clear as MacInTax's, and often TaxCut involves more tedious steps. For instance, where MacInTax uses a single screen containing a dozen fields for different types of Schedule E rental expenses (repairs, property taxes, and so on), Kiplinger TaxCut requires you to click through a page for each item.

Even with the extensive interviews, tax-prep software doesn't make income-tax preparation automatic—the tax code requires you to make technical decisions, such as selecting methods of depreciation. Both programs offer hypertext definitions of tax terms, and lots of tax and reference information with links to Web-based info.

However, MacInTax integrates more



**Tax on a Mac** MacInTax's QuickTime movies explain the finer points of the 1997 tax code (top). Like MacInTax, Kiplinger TaxCut interviews you, but it also lets you jump between topics (bottom).

tax information into the interview process by offering reminders. For example, when you enter non-W-2 income, MacInTax warns you that if you received a cash payment of more than \$10,000, you must report it on Form 8300. Kiplinger TaxCut offers some of this kind of information, but not nearly as much.

As in previous versions, MacInTax uses QuickTime movies to explain the program and more complex tax-code issues. Many movies are helpful in conveying information on topics such as the new capital-gains rules, the difference between direct and indirect expenses for a home office, and the new health-insurance deductions for the self-employed. TaxCut also covers these topics but sticks to text, and in some cases gives you only the IRS's dry explanations.

## Double-Checking

Both programs check your documents for errors. TaxCut checks your tax forms at the end of the interview process, or you can manually select the Audit command

from the Tools menu. A button takes you to a worksheet where you can change your entry, so you don't need to step back through the interview to correct data.

Although TaxCut's technique is effective, fixing problems is easier in MacInTax. At the end of each major form, MacInTax reviews the document and prompts you to save the data. In one test, I entered the same Social Security number for spouse and child. Kiplinger TaxCut found the error and a button brought me to the worksheet with the child's number, but it was difficult to find where to change the spouse's incorrect number.

Another nice feature of MacInTax is the ability to calculate the maximum Keogh or SEP contribution allowed based on your earnings. The amount you enter changes the amount of your tax due or refund, so you can find an optimal amount.

MacInTax has one annoying quirk: you need to have the CD-ROM in your Mac to run the application. TaxCut also comes on a CD-ROM, but thankfully it's only required during installation.

Both programs let you file your taxes electronically with the IRS without additional cost. However, veteran users accustomed to "planning" versions should note that these editions aren't available this year.

## Macworld's Buying Advice

MacInTax Deluxe costs a bit more than Kiplinger TaxCut, but it is easier to use. The step-by-step explanations, combined with the data filtering, in either of these programs gives you a good handle on the new changes in tax code.—JOHN RIZZO

## Kiplinger TaxCut 1997

**RATING:** ★★★★★ **PROS:** Straightforward interview process; up-to-date tax information; good performance. **CONS:** Sometimes difficult to fix errors. **COMPANY:** Block Financial (800/235-4060, [www.taxcut.com](http://www.taxcut.com)). **LIST PRICE:** \$29.95; state modules, \$24.95 each.

## MacInTax Deluxe 1997

**RATING:** ★★★★★½ **PROS:** Easy to use and navigate; comprehensive interview process; easily accessible tax-code information. **CONS:** Requires CD-ROM in drive to run. **COMPANY:** Intuit Software (520/295-3110, [www.macintax.com](http://www.macintax.com)). **LIST PRICE:** \$49.95; state modules, \$24.95 each.



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# Bryce 3D

## ANIMATION ENLIVENS 3-D TERRAIN GENERATOR

**N**OT CONTENT WITH THE CAPABILITIES of its already impressive terrain generator, MetaCreations has added an assortment of tools and features to the latest version of Bryce. (Not content with the name either, the company is now calling it Bryce 3D, which is somewhat puzzling since the program has always produced 3-D scenes.) The new version gives you more control over the appearance of clouds, water, and material textures and, most notably, lets you animate the scenes you create. The additional controls, plus a greatly enhanced manual, make Bryce 3D even more pleasurable to use.

### Making a Scene

In case you're not familiar with Bryce (and don't have a copy of *Macworld's* August 1996 review of Bryce 2 handy), this Power Mac-only program lets you create fanciful or realistic landscapes in 3-D space. You can import DXF, 3DMF, and OBJ objects into Bryce landscapes; use preset terrains, water, skies, textures, and Boolean objects; or customize the preset elements in one of the program's many editing environments. For example, you can use the Terrain Editor to make peaks craggier or smoother and the Materials Editor to select the rock they're made of. You can adjust attributes, such as lighting or viewing angle, and fine-tune details ranging from the amount of haze in the sky to the reflectivity of an object. You save your finished scenes as Bryce files or export them as PICT, QuickTime, QuickTime VR, or Adobe Photoshop 3 files.

Before Bryce renders a scene, you can preview it as a thumbnail, wireframe, or low-resolution image. If all you want to do is quickly check the appearance of a lighting change or custom texture, you can render just a portion of the scene. Rendering can take hours, depending on the image's complexity, but the manual offers strategies for speeding up rendering; for example, if you delete an object from a scene, you may be able to rerender just the area the object occupied.

Bryce 3D's user interface is somewhat unorthodox. For instance, dialog boxes

present a check mark for "OK" and an X for "Cancel," and some of the editing controls have you slide the pointer over a



**Add a Little Atmosphere** Bryce 3D's Environmental Attributes palette lets you add effects such as rainbows, star fields with comets, and rings around the sun or moon.

sort of on-screen trackball. The graphically oriented controls take some getting used to, but once you become fluent with them, it's easy to edit and preview a scene. For the most part, Bryce is cleverly designed; auxiliary features are hidden away until you select them, avoiding on-screen clutter.

### Impressive New Effects

Among Bryce 3D's new features is the ability to apply a texture to the entire volume of a 3-D object rather than just its surface, a useful way to create clouds and underwater scenes that can be penetrated by objects, cameras, or lights. New controls let you fine-tune the appearance of clouds and add environmental effects; a "horizon effect" makes the sun or moon appear larger when it's at the horizon. The new version also lets you add visible light sources and "infinite slabs," planes with depth that you can use to create realistic bodies of water.

With the new Deep Texture Editor, you can make minute adjustments to a texture's color, bright and dark areas, and bump pattern. Although the fairly complex controls can be a bit intimidating at first, the manual devotes an entire chapter to texture editing, and you can preview your changes as you make them.

Bryce 3D's most impressive new features are in the realm of animation. Effective, easy-to-use tools let you animate objects in a scene and generate fly-through animations by controlling the position of a camera. You can also animate materials by manipulating how an object's or terrain's surface reacts with light, producing the fading light of a sunset, bubbling lava, a shimmering lake, or a slowly appearing rainbow.

To animate objects or the camera, you set the animation's duration and specify keyframes; Bryce fills in the intermediate frames when it renders the animation. For variable-speed animations—a bouncing ball that changes velocity, for example—the Advanced Motion Lab lets you remap keyframes to create velocity effects. To animate a material, you set two frames (the beginning and final material) and Bryce interpolates between them to create a smooth transition.

One of my main complaints about earlier versions was the skimpy manual. A solid, 450-page tome corrects that deficiency, with tutorials, detailed descriptions of features, and a thorough index (although it could use another round of copyediting).

### Macworld's Buying Advice

Bryce 3D is one of those rare graphics programs that can produce impressive results for artists and nonartists alike. A dabbler can throw together some preset objects and terrains, fiddle with the lighting a bit, and produce a respectable photo-realistic landscape, while an artistically inclined Bryce user can take advantage of the program's advanced features to create some spectacular scenery. The additional features in Bryce 3D give artists more ways to customize the elements that make up their landscapes, and the new animation tools make the program even more fun.—ERFERT FENTON

**RATING:** **PROS:** Better control over material editing; new animation tools; better manual. **CONS:** None significant. **COMPANY:** MetaCreations (805/566-6200, [www.metacreations.com](http://www.metacreations.com)). **COMPANY'S ESTIMATED PRICE:** \$199.

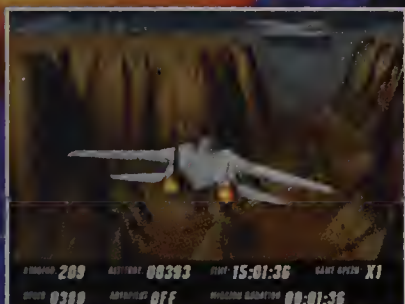


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# Creator2

NEW PAGE-LAYOUT PROGRAM RIVALS QUARKXPRESS

**Y**OU CAN'T HELP BUT BE SKEPTICAL of a program that dares to challenge professional-quality, industrial-strength tools such as QuarkXPress and Adobe PageMaker. But Multi-Ad Services' new page-layout system, Creator2, offers enough in the way of typographical precision and high-end graphics support to impress even the toughest customers in the desktop-publishing world. Although it's based on Multi-Ad Creator, a heavy-duty display-advertising-design program that's been a mainstay in the newspaper industry for years, Creator2 is flexible enough to handle a variety of documents.

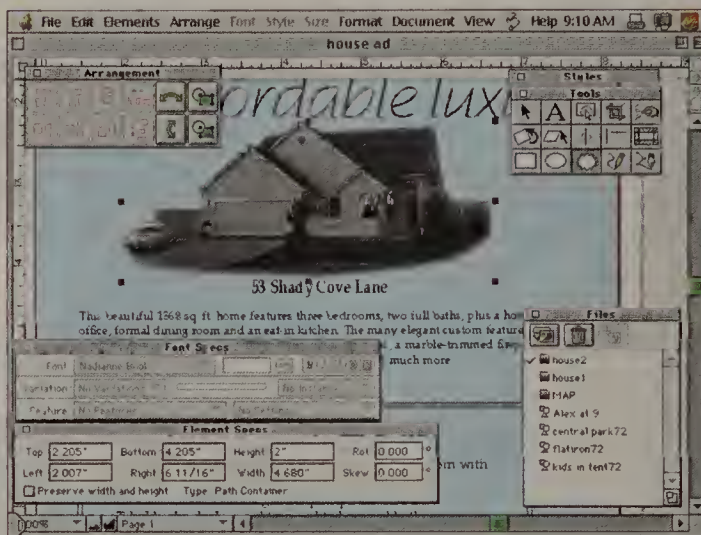
## Typographical Tools

Creator2 looks and feels a lot like QuarkXPress: You compose pages by drawing boxes and then typing (or importing) text to fill them; you can import graphics in a variety of standard formats and draw page elements, such as rules and frames, using built-in drawing tools.

In the way it handles these tasks, Creator2 proves itself to be a professional-caliber tool that lets you manipulate page elements quickly and powerfully. With Creator2's copy-fitting commands, for example, you can automatically grow text to fill a text box or resize a box so the text fits precisely. Another beautifully streamlined tool is the Make Matrix command; it lets you arrange a series of linked text boxes on a page without having to draw them one at a time or duplicate and then link them manually, an approach that dances circles around QuarkXPress's Step and Repeat command. Adding to the program's flexibility is support for multiple page sizes—you can create projects with a variety of page sizes within a single document, something QuarkXPress can't do.

Creator2 also offers a great deal of typographical precision. You can adjust leading and tracking and kern text to within 1/1,000 of an em, for example, and you can apply such effects as changing the slant and weight of characters and adding shadows to text. Although Creator2 owes much of its typographical precision to QuickDraw GX, you *don't* have to install that program or switch to

QuickDraw GX fonts; the GX Graphics system extension included in Creator2 lets you tap into the GX technology with-



**Batch Importing** You can import a batch of images into Creator2's Files palette (lower right) and then add the listed files to document pages by dragging the images into place.

out having to reinstall printer drivers and fonts. But while the GX Graphics extension adds compatibility, it increases the potential for system conflicts.

Unfortunately, not all of the typographical controls are easy to access. You can adjust some settings through the Font Specs palette, but leading and tracking are tucked away in a dialog box. On the positive side, you can use AppleScript to automate a number of formatting tasks; Creator2 isn't just scriptable, it's recordable, making it easy to build your own scripts.

## Graphics Support

Like QuarkXPress 4.0, Creator2 includes a full set of Bézier drawing tools to create boxes, frames, rules, and other elements of any shape. Both programs let you convert text into boxes, which you can then fill with colors, pictures, or more text. Creator2's tools aren't quite as powerful or sophisticated as those in QuarkXPress—for example, you can't bind text to a curved path. Its built-in masking features are particularly strong, however. Choose the Mask Graphic command with an imported picture selected, and Creator2 creates an editable mask around the picture so you can selectively crop out parts of the picture.

In Creator2, any object can become a container for another object. For example,

using the Containment tool, you can drag a text box into a starburst shape and hold down different keys to make the text either fill the starburst or be cropped by it. You can then manipulate the two objects as a single element.

For projects that use color, Creator2 lets you not only create separations but also view them on screen—a very helpful proofing tool for professional designers. The program also supports element trapping, so you can create custom traps for any object on a page.

Adding graphics to a project is especially easy with Creator2's Files palette (one of eight palettes that allow access to the program's key commands). You can import an entire folder of images into the Files palette and then add the images to pages simply by dragging them from the palette.

Though rich in features, Creator2 suffers from some surprising omissions. It doesn't support drag-and-drop text editing, you can import formatted text from other word processors only by using the Mac Easy Open or MacLink Plus converter, you can't format text as small caps, and there's no easy way to create drop caps. And Creator2 is clearly not optimized for creating longer documents; the program can't generate an index or table of contents.

## Macworld's Buying Advice

Creator2 is the first page-layout application I've seen that is indeed a compelling alternative to QuarkXPress—though the similarly priced XPress is still the better choice. Creator2's dependence on the GX Graphics extension is a bit of a drawback, and some key features seem to be missing, but the program is packed with impressive tools for assembling documents quickly and professionally.—JOSEPH SCHORR

**RATING:** ★★★½ **PROS:** Strong set of page-layout tools; lets you view separations on screen; good tools for creating matrices of linked text boxes. **CONS:** Some typographical tools are difficult to access; no support for drop caps; no drag-and-drop text editing; requires GX Graphics extension. **COMPANY:** Multi-Ad Services (309/692-1530, [www.multi-ad.com](http://www.multi-ad.com)). **LIST PRICE:** \$995.



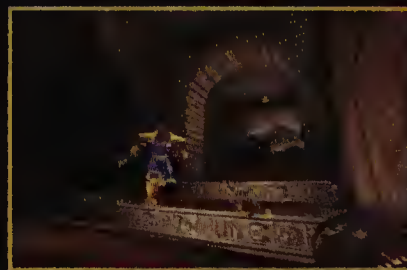
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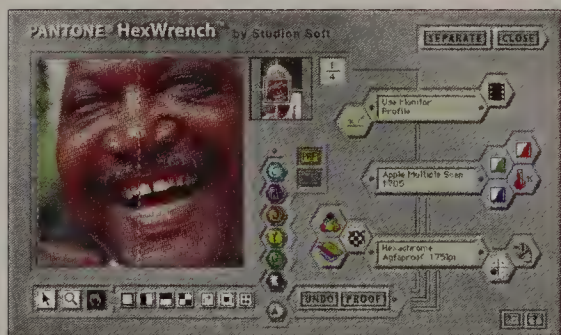
# Photoshop Color Plug-Ins

PLUG-INS DELIVER SMALLER FILES, EXPANDED COLORS

**A**DOBE PHOTOSHOP OWES AT least part of its success to its extensible architecture: third-party plug-ins help users create everything from Web graphics to high-end, multicolor prepress files. Three such packages are BoxTop Software's ImageVice 1.0, a color-reduction plug-in for Web graphics, and Pantone's suite of advanced printing-preparation plug-ins—HexWrench 1.0, and MC-P/CoCo bundled with Channel 24—all designed to expand the color-processing options found in Photoshop.

## Squeezing Pixels

Designed to shrink GIF files while preserving image quality, ImageVice reduces colors based on how we perceive color rather than by statistically polling the most common colors in an image. It offers four controls for reducing colors: the



**Six Degrees of Separation** HexWrench's many options are well organized, and you can trace the flow of image processing by following the vertical lines on the right.

color-depth setting determines the palette for the image; the clipping control forces dark and light colors to black and white; the smoothing control determines the threshold at which one pixel is blended with an adjacent, similar color; and the convergence parameter groups similar colors into horizontal bands and stripes for efficient compression.

Depending on the image and on ImageVice's settings, the resulting GIFs are 25 to 70 percent smaller than comparable GIFs converted using Photoshop's Indexed Color mode. But the negative visual artifacts are obvious, and the lack of zoom and pan controls in the tiny compression preview window makes accurate

previews nearly impossible. Digital Frontiers' HVS Color (see *Reviews*, October 1996) offers not only better previews, visual results, and color-reduction controls, but also the ability to generate either GIFs or JPEGs.

## Expanded Palette

Pantone's prepress and color-separation tools help Photoshop deal with alternative printing techniques and file formats. Although they specifically target Hexachrome color separations—CMYK, plus green and orange—these plug-ins can also be used for hi-fi color, spot color, varnish and bump plates, and stochastic screening. They all work in tandem with the SAME (Studio Appearance Management Environment) extension, which attempts to compensate for color differences among scanners, monitors, and printers with SAME profiles.

HexWrench prepares Hexachrome image separations, which you can preview on screen before running expensive film separations or proofs. The program comprises two plug-ins and a stand-alone application. The HexWrench/DCS plug-in allows Photoshop to read and write files in Desktop Color Separation 2.0 format; the HexWrench/PS filter lets you preview Hexachrome separations in Photoshop (a split-screen window lets you compare CMYK and Hexachrome proofs side by side) and save them as DCS 2.0 files. To produce an 8-bit, 72-dpi DCS file and six gray-scale Photoshop EPS images, one for each color plate, you simply click on the Separate button. The stand-alone component, HexWrench/Tuner, calibrates color among devices. Once you've selected a profile, the software formats and prints a test chart that you can then sample with a spectrodensitometer to identify color inconsistencies.

MC-P/CoCo lets you make up to 16 single-color alterations in either CMYK or RGB mode. Each channel can have its own name and color; you can assign alpha channels or extra color channels to Pantone spot colors, varnish layers, and hi-fi and Hexachrome images. The color ranges that MC-P/CoCo selects are antialiased, and the Range parameter

restricts color selections to very specific portions of images. Although the Range parameter offers only ten levels of spreading and you can't use drag and drop to assign the current color value to the target values, prepress professionals will appreciate MC-P/CoCo's expanded color-correction controls.

Channel 24 lets you save and load multichannel images as DCS files. Because it's a plug-in, however, it has no interface for perfecting Hexachrome and hi-fi color files as HexWrench/PS does. And unlike HexWrench/DCS, it lets you alter the color contents of each channel as the file is saved and doesn't necessarily generate Hexachrome separations. Its only drawback is that it lacks a default profile button.

## Macworld's Buying Advice

While most designers and artists rarely find themselves producing color separations for Hexachrome or hi-fi printing, those who do will undoubtedly find Pantone's HexWrench, MC-P/CoCo, and Channel 24 a winning combination. ImageVice is fairly good at color reduction, but Digital Frontiers' HVS Color offers better results with more control.

—NATHAN MOODY AND DAVID BIEDNY

## HexWrench 1.0

**RATING:** ★★★★★ **PROS:** Great control over Hexachrome color separations; full compatibility with ColorSync device profiles; dynamic previews; well-designed interface. **CONS:** Requires prepress knowledge. **COMPANY:** Pantone (201/935-5500, [www.pantone.com](http://www.pantone.com)). **LIST PRICE:** \$499.

## ImageVice 1.0

**RATING:** ★★★½ **PROS:** Good visual results at low settings; simple interface; adequate alternative to Photoshop's color-reduction tools. **CONS:** Discernible artifacts; poor image preview. **COMPANY:** BoxTop Software (601/324-1800, [www.boxtopsoft.com](http://www.boxtopsoft.com)). **LIST PRICE:** \$49.95.

## MC-P/CoCo and Channel 24

**RATING:** ★★★ **PROS:** Rapid image previews; useful for last-minute changes to color specs. **CONS:** Poor documentation; color picking could be finessed. **COMPANY:** Pantone (201/935-5500, [www.pantone.com](http://www.pantone.com)). **LIST PRICE:** \$499.





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**Macworld**

## VST Zip 100

BETTER-THAN-DESKTOP PERFORMANCE

**P**OWERBOOK FANS HAVE LONG agreed that a Zip drive would be a natural occupant for their portable's expansion bay. It would simplify grabbing files from a desktop Mac. It would make backing up a PowerBook simple for the first time. And it would be the perfect solution for travelers who store a hard-disk backup, a presentation, or a Web site on each Zip disk.

After more than a year's delay, the VST Zip 100 drive has finally arrived. One version works with the PowerBook



ARNOLD TIOSEJO

5300, 190, 3400, and G3 models; a second unit fits the 1400. And fit it does: once you've clicked this sleek, lightweight unit into place, it disappears. The exposed surface is colored and shaped to blend perfectly, and even the disk slot is hidden by a spring-loaded dust door.

This drive works exactly like desktop Zip drives, right down to the status lights and the pinhole for popping out a stuck disk (or for ejecting a disk when the PowerBook is powered off). In fact, the VST Zip is *faster* than a desktop Zip drive, although not as fast as the new Zip Plus drives. And this drive ejects a Zip much more gently than the desktop version, the better to avoid knocking the soda off your airplane tray table.

The VST drive is hot-swappable, too: when there's no disk in the drive, you can pop the drive out and replace it with your floppy drive without even putting your laptop to sleep. (The Read Me file suggests shutting down the PowerBook 1400 before swapping and that Apple is working on a fix.)

The Zip starter disk contains the usual software: a backup program, a preferences control panel, and a special Zip extension (the VST drive doesn't work with the standard Iomega extension). This starter disk even includes a Mac OS 8 System Folder—and instructions for starting up from it if your hard drive croaks. For the traveler who can't risk a hard-drive failure on the road, that thoughtful gesture turns this Zip into a security blanket right out of the box.

Just as portable computers cost more than desktop models, the portable Zip costs about \$150 more than a regular Zip. Consider the alternative: packing an external Zip drive, its big black power adapter, and a PowerBook SCSI adapter—and having to shut down every time you want to swap the drive.

### Macworld's Buying Advice

If you can handle the price, the VST Zip 100's speed, clean design, and convenience amply fulfill the PowerBook expansion bay's promise. PowerBook users have nothing to lose but their jam-packed briefcases.—DAVID POGUE

**RATING:** ★★★★★ **PROS:** Sleek and well designed; hot-swappable; faster than standard desktop Zip drive; includes Mac OS 8 startup disk. **CONS:** Not cheap. **COMPANY:** VST Technologies (508/263-9700, [www.vsttech.com](http://www.vsttech.com)). **LIST PRICE:** \$350.



### VST Zip 100: Faster Than Desktop Model

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► New product.

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► VST Zip 100	101.9	50.7	21.6	18.8
Iomega Zip	139.3	49.9	22.4	21.7

#### Behind Our Tests

For information on our test suite, see "Zip Plus," *Reviews*, February 1998, or [www.macworld.com/tests/](http://www.macworld.com/tests/).—Macworld Lab testing supervised by Gil Loyola



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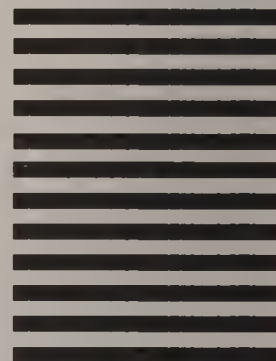
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## PhotoTools 2.0

UTILITARIAN PHOTOSHOP PLUG-INS

**A**IMED AT LESS EXPERIENCED users of Adobe Photoshop, Extensis PhotoTools 2.0 helps you create a variety of special effects. Photoshop pros may decide that many of the effects are just as easy to create without a separate plug-in, but more-mainstream users should find at least a few of the filters useful in day-to-day production work.

PhotoTools 2.0 lets you access its filters not only via a new menu it adds to Photoshop but also through the customizable PhotoBars it places in Photoshop's tool palettes. These iconic commands can trigger any Photoshop menu



**PhotoText Makes the Grade** PhotoTools' text plug-in lets you set type with professional-style options and preview image layers from within the plug-in.

command, open files within Photoshop, open specific folders in the Finder, and bring the Finder to the foreground. Given that Adobe replaced the Commands palette with the less straightforward Actions palette in version 4.0, advanced Photoshop users will find PhotoBars a welcome addition.

New to PhotoTools 2.0 are the PhotoButton and PhotoCastShadow filters, which automate the creation of 3-D buttons and skewed drop shadows, respectively. If you're creating 3-D buttons for multimedia and Web pages, you should appreciate PhotoButton; it lets you customize the beveling, shading, lighting, and highlighting automatically added to PhotoTools' 16 basic shapes (though you can't import custom shapes). And the new PhotoCastShadow creates drop shadows to which you can apply distortion or additional perspective blur.

The PhotoText filter's text-handling capabilities were the reason to own

PhotoTools 1.0; version 2.0 adds some welcome enhancements, such as basic style sheets and the ability to save entered text to disk. Surprisingly absent are super- and subscribing, as well as support for importing text files from external sources (you can open only text that's saved from within PhotoText, although you can paste Clipboard text into the text-entry area).

The PhotoEmboss and PhotoGlow modules are unchanged from version 1.0 and are reasonably good for anyone confused by Photoshop's advanced layering capabilities. Novices will enjoy the interactive aspect of the PhotoEmboss filter, which offers flexible cutout and dimensional control over a layer. The PhotoGlow filter, also designed for novice users, does an acceptable job; less uniformity around the edges of the glowing object would yield a much more realistic glow, however.

All the PhotoTools plug-ins offer the added benefit of real-time updates, unlimited undos within the actual filter environment, and a clean interface that doesn't hinder productivity (a problem with some other third-party plug-ins). You can preview multiple layers within any of the modules, an incredibly useful feature under real-world production conditions and one that's unique to PhotoTools. The new version does away with the annoying Photoshop Tip of the Day that older versions displayed when Photoshop launched; also missing is the stripped-down version of Extensis Intelhance, a scanning-optimization utility that was included in version 1.0.

### Macworld's Buying Advice

PhotoTools 2.0 is a balanced set of practical, if not perfect, additions to any Photoshop artist's toolbox. While not as flashy as other Photoshop plug-ins, such as Alien Skin's Eye Candy and MetaCreations' Kai's Power Tools, it's eminently more useful than most.—DAVID BIEDNY

**RATING:** **PROS:** Brings much-needed text-handling capabilities to Photoshop; quick and easy creation of drop shadows and 3-D buttons; can preview multiple layers; enhances usefulness of Photoshop's interface. **CONS:** Text tool lacks super- and subscribing and can't import text from word-processing programs. **COMPANY:** Extensis (503/274-2020, [www.extensis.com](http://www.extensis.com)). **COMPANY'S ESTIMATED PRICE:** \$129.95.



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## Software-Updating Services

INTERNET-BASED UTILITIES BATTLE OUTDATED SOFTWARE

**E**VEN IF YOU USE ONLY ONE MACintosh, keeping your applications up-to-date can be a challenge. Throw in the usual mix of control panels, extensions, plug-ins, and other components, and it's enough to make a seasoned computer veteran cry for help. Insider Updates and Shaman Update Server Personal Edition make the job bearable by finding and retrieving updates for you automatically.

Unlike Shaman Update Server, which is designed for networked computers (see *Reviews*, October 1997), Insider Updates 2.01 and Shaman Update Server Personal Edition 1.2 work only on stand-alone

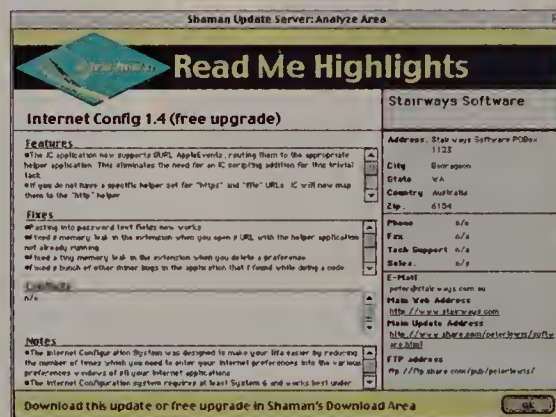
Besides correcting a bug that prevented the program from functioning behind proxy-based firewalls, the new version is compatible with both PowerPC and 680X0 Macs; the Shaman product works only with PowerPC Macs.

Shaman's interface is more elaborate than Insider's, although I found it a bit confusing in places and the animated splash screen to be quite annoying. On the plus side, Shaman offers significantly more useful information about updates than does Insider (see "Update Info"). On my Mac, Shaman also came out ahead on accuracy: although each program listed some updaters that the other missed, Shaman identified more out-of-date software than did Insider Updates.

It's important to keep in mind that both services are designed to deliver *updates*—which commercial vendors usually offer at no charge on their Web sites—as opposed to *upgrades*, which typically incorporate significant improvements and come at a price.

### Macworld's Buying Advice

Virtually all the updates in Shaman's and Insider's databases are already available elsewhere; only you can decide if the added convenience and peace of mind are worth it. If you spend as little as 15 minutes a week seeking out updates for your software, paying \$6 or \$7 a month may make sense.—FRANKLIN TESSLER



**Update Info** Where Insider Updates shows you only the version number and size of the available updaters, Shaman Update Server offers more information about each updater so you can decide if it's worth downloading.

Macs. You specify which local volumes you want checked, and the application scans your drives, comparing your software inventory against an Internet database. You select the updates you need, and the program downloads the updaters from Shaman's or Insider's private server or directly from the vendor.

To use either updating service, you need at least a 28.8-Kbps connection to the Internet. The Shaman CD includes more than 600MB of updates, so you'll probably save some downloading time until those updates become outdated. To get Insider Updates, you download the application and purchase an access code from Insider's Web site.

If you prefer the no-frills approach, you'll appreciate Insider Updates' simple interface. Insider is also easier on RAM, requiring a mere 1,121K of memory compared with Shaman's whopping 11MB.

### Insider Updates 2.01

**RATING:** ★★★ **PROS:** Simple interface; small memory requirement; compatible with 680X0 Macs. **CONS:** Doesn't provide detailed information about available updates. **COMPANY:** Insider Software (760/804-9900, [www.theinside.com](http://www.theinside.com)). **LIST PRICE:** \$80 per year.

### Shaman Update Server Personal Edition 1.2

**RATING:** ★★★½ **PROS:** Comprehensive update database. **CONS:** Confusing interface; large memory requirement. **COMPANY:** Shaman (415/241-9952, [www.shaman-update.com](http://www.shaman-update.com)). **LIST PRICE:** \$69 per year.



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# Puffin Designs Commotion 1.1

ROTOSCOPING POWERHOUSE

**T**HE RELEASE OF COMMOTION 1.0 marked a critical moment in Macintosh software history: no longer were expensive hardware solutions necessary to create special effects and moving-image enhancement (see *Reviews*, January 1998). And not only is Commotion the first truly mature, robust rotoscoping environment for the Macintosh, but it has also become a compelling reason for video professionals to continue to use the Mac for serious production work.

For the first time, uncompressed film and video frames can be played back in real time on a Macintosh, with a frame rate limited only by the amount of available RAM. It's important to use Commotion with a video board that has decent acceleration. We tested the program on a Power Mac 9600 with a Newer Technology 250MHz G3 processor board and an iXMicro Twin-Turbo 8MB video board, which provided real-time 30-frames-per-second playback of a 640-by-480-pixel clip.

Commotion 1.1's new features include support for field and frame painting; "natural" RotoSpline vector shapes; RotoSpline



**Animated Splines** Commotion's RotoSplines allow precise masking and enhancement of natural moving shapes in an action sequence.

motion blur; more file formats, such as Adobe file-format plug-ins; an improved Super Clone Brush; and enhanced automatic dirt removal.

In Commotion, you can paint on frames directly without immediately rendering the strokes. In fact, you can paint on interlaced video frames and address both sets of video fields without worrying about which field set (even or odd) is dominant—

both sets of fields will register the final rendered paint strokes. And when you save the new frames, the paint strokes are automatically resolved.

Other cool improvements in Commotion's latest version include easier keyboard shortcuts and an automated dirt filter that scans for and removes dirt and dust specks.

Puffin Designs has also introduced a player-only version of Commotion that doesn't include hardware-key protection, for \$399, which will appeal to the lower end of the videophile market.

**Macworld's Buying Advice** Artists who regularly work in both Adobe After Effects and Premiere agree that Commotion is the missing link in the Mac-based film- and video-effects market. Improving on version 1.0's impressive capabilities, Commotion 1.1 is a strong incremental upgrade to a unique and powerful Mac-based tool.

—DAVID BIEDNY AND NATHAN MOODY

**RATING:** ★★★★★½ **PROS:** Speedy video playback; professional-quality rotoscoping tools; robust masking and compositing support. **CONS:** Hefty RAM requirements; hardware-key copy protection. **COMPANY:** Puffin Designs (415/331-4560, [www.puffindesigns.com](http://www.puffindesigns.com)). **LIST PRICE:** \$2,495.

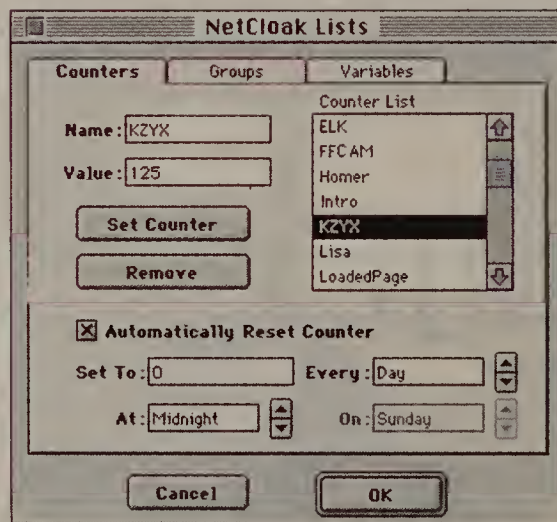
## NetCloak 2.5

COUNTERS, COOKIES, AND MORE

**O**NE OF THE MOST POPULAR add-ons for Mac-based Web-server software, Maxum Development's NetCloak 2.5 bundles essential server-software enhancements ranging from page counters to conditional commands that deliver different content depending on the date and time. It's the single most versatile server add-on you can buy.

Although the latest version sports dozens of new features and commands, it still relies on easy-to-use, HTML-like commands that you add to your pages. When one of your pages is visited, the application scans the page; processes any NetCloak commands it finds; and passes the results, along with the page's HTML, to your Web-server software. NetCloak commands automate common chores, such as displaying page counters, inserting the time and date, displaying a randomly chosen graphic each time a page is loaded, showing or hiding HTML depending on a user's browser or domain address, and redirecting a user's browser to a different page depending on certain conditions.

The new version's improvements fall



**Count on It** NetCloak 2.5's enhanced administration features make it easy to examine and reset counters. Here, a counter is configured to reset every day.

into two broad categories: server-software compatibility and command enhancements. On the compatibility front, NetCloak now works with virtually all Mac OS-based server software and supports the new PIXO standard for server plug-ins. As for command enhancements, NetCloak 2.5 adds support for HTTP cookies; several new commands create cookies and manipulate their values, letting you track visitors' progress through your site and display information based on the pages they've already seen. It also offers better support for variables, which among

other things let you store and process information entered into forms.

A new page-counter option lets you specify that one or more counters be reset to zero at specific intervals (such as at the beginning of each day), while other new commands insert those reset dates in a page. Enhanced administration features make it easy to work with counters and variables.

Using NetCloak's more advanced commands can be tricky. Fortunately, the manual is greatly improved: it's much larger and offers numerous examples, a detailed table of contents, and an index. The NetCloak disk includes plenty of examples that you can dissect.

**Macworld's Buying Advice** NetCloak 2.5 continues Maxum's tradition of providing reliable, well-designed enhancements for Mac OS-based Web-server software. If you want to make your Mac-served Web site more dynamic, put NetCloak at the top of your shopping list.—JIM HEID

**RATING:** ★★★★★ **PROS:** Enhanced command set; excellent support for cookies and variables; improved documentation. **CONS:** More-advanced commands can be tricky. **COMPANY:** Maxum Development (630/830-1113, [www.maxum.com](http://www.maxum.com)). **LIST PRICE:** \$195.



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# PowerPrint 4.0

FASTER ACCESS TO PC PRINTERS

**L**IKE IT OR NOT, PC PRINTERS ARE in the majority in schools, offices, and homes. For cost-conscious people and organizations, a few-years-old PC printer would make a great partner with older systems . . . except they don't work with Macs. Likewise, many special-purpose printers (including wide-format, continuous-feed, multifunction, and label printers) have no Mac-friendly equivalents.

PowerPrint, a software-and-cable combination from Infowave Imaging (formerly GDT Softworks), lets you use any of several hundred PC printers with your Mac. The software portion consists of a set of drivers; you simply install the appropriate files for the device that's hooked up to your Mac. (To view a list of supported PC printers before you buy, check out the PowerPrint site, at [www.infowave.net](http://www.infowave.net).)

Compared with previous versions, color reproduction tended to be a little more faithful: colors are more saturated in version 4.0 than they were in version 3.0. More important for day-to-day use, the new version is significantly faster: it performed more than twice as fast in informal tests as



ARNOLD TIOSEJO


version 3.0.2. On an Epson Stylus Color 800, PowerPrint 3.02 took 561 seconds to print a full-page color photo, compared with 243 seconds in PowerPrint 4.0. On a PC, though, the same photo took just 52 seconds to print, while a printer connected to a Mac directly via a serial cable—rather than using PowerPrint—took 49 seconds to image our test file. (For testing purposes, we chose a printer that had both a PC and a Mac connection; you don't need PowerPrint if your printer offers Mac connectivity.)

The increased speed in this version comes from improved drivers and a new serial-to-parallel cable adapter, the key to PowerPrint's ability to connect your Mac to a PC printer's parallel port. In addition to accelerating print times, the new cable is

slightly longer than the old one: 7 feet versus 6. It now requires an ADB port as its power source, which is no problem for desktop Macs and full-size PowerBooks, thanks to a pass-through connector. (For the ADB-less PowerBook Duo series, Infowave offers a special version of the cable.)

**Macworld's Buying Advice** PowerPrint is significantly improved in version 4.0. Its ease of installation and use hasn't changed—there wasn't anything to improve—but the dramatically faster speed and longer cable are welcome enhancements. For \$100, you can make a useless PC printer useful again. (And if you're on a network of multiple Mac users who need to share a PC printer, Infowave also offers a \$200 PowerPrint Pro version.)

Sure, new color ink-jet prices start as low as \$200—a better deal for most folks than reviving an older PC model—but many special-purpose PC printers don't have Mac equivalents. For these, PowerPrint is a necessity.—GALEN GRUMAN

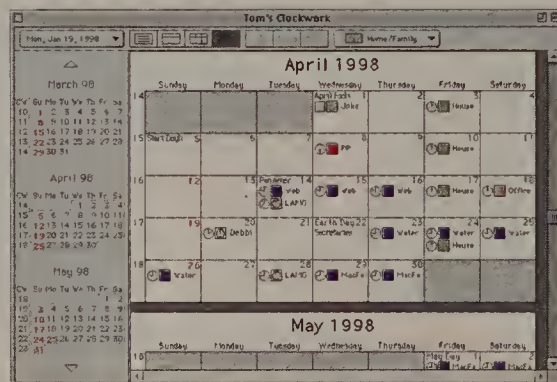
**RATING:**  **PROS:** Easy to install and use; improved print times; longer cable. **CONS:** Noticeably slower than printing from a PC. **COMPANY:** Infowave Imaging (604/291-9121, [www.infowave.net](http://www.infowave.net)). **LIST PRICE:** \$100.

# ClockWork

NEW PIM SHOWS PROMISE BUT IS ALREADY BEHIND THE TIMES

**A**T A TIME WHEN MOST DEVELOPERS seem to be frantically revving up their Windows versions, it's refreshing to find Mac-only products that really exploit Mac OS technologies. A case in point is ClockWork 1.0, the new calendar program from Century Software. As a new entry in a mature market, ClockWork shines in ease of use and does a fair, although unspectacular, job of handling events and to-do's.

Available only via download from Century's Web site, ClockWork is a breeze to set up and offers hassle-free importing of data files from other calendar programs. It presents a very Mac-like interface, and Undo works from anywhere in the program (a concept more developers should embrace). You create events and to-do's from the same dialog box. Month, week, day, and list views are available; a bar on the left side of the screen shows the current, previous, and following months. You can set alarms for any item, and your PowerBook (and most Power Macs) can be set to power on automatically when an alarm goes off.



**Looking Forward, Looking Back** ClockWork gives you a useful scrollable bar that lets you view previous and future months while still viewing the current month in detail.


Unlike competing programs such as Now Up-to-Date and Claris Organizer, ClockWork lacks memo items, a data-entry tool that appears as a menu item in the Finder, and banners for multiday events. You can assign events and to-do's to only one of eight customizable categories (such as Meeting or Travel), and to-do's lack a priority setting, limiting the program's utility as a personal organizer.

ClockWork offers good bidirectional file synchronization between desktop machines and a copy of the calendar file on a PowerBook. It also synchronizes events and to-do's with Newton MessagePads and eMates but not, unfortunately, with the

3Com PalmPilot. ClockWork prints at many standard day-planner sizes, and you can share your calendar file with your workgroup over an AppleTalk network via publish and subscribe; no server is required.

Making good use of other Mac OS technologies, ClockWork is fully scriptable and recordable via AppleScript and offers a handy Scripts menu. You can use MacinTalk to speak your daily appointments, and you can add sound annotations to any item. International users will appreciate that the program displays many countries' holidays and supports WorldScript and Unicode; it can even synchronize Kanji text to a Newton.

**Macworld's Buying Advice** ClockWork shows promise, but it needs some polishing before it can compete head-to-head with more-mature products. Unless you're an international user or a Newton aficionado, you might want to wait for the next version.—TOM NEGRINO

**RATING:**  **PROS:** Easy to set up and use; good PowerBook and Newton synchronization; international support. **CONS:** Lacks some common PIM features; no PalmPilot synchronization. **COMPANY:** Century Software (408/273-6076, [www.centsoft.com](http://www.centsoft.com)). **LIST PRICE:** \$49 (single user; multiuser versions available).



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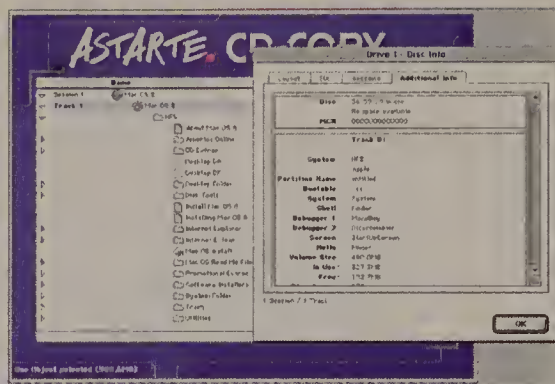
# Astarte CD-Copy 2.0

UTILITY EASES CD-MASTERING TASKS

**W**ITH THE FALLING PRICES OF CD-R drives and media, more people are making their own CDs. In fact, the glitzy CD-ROM has almost crowded the mundane floppy disk out of its traditional niche, but the larger shiny new disc still isn't quite as easy to use as the venerable plastic square. For those who like to make their own CDs, however, CD-Copy 2.0 makes the task of collecting data easier.

CD-Copy lets you grab files from standard Macintosh or ISO-9660 discs, as well as from audio CDs, and save them to your hard disk, either by saving files from within CD-Copy or by using a straightforward drag-and-drop method. Once you have the files on your hard disk, you can edit them further or accumulate them as you build the contents of a prospective disc.

CD-Copy supports most SCSI CD-ROM drives, as well as numerous ATAPI models, such as those found in recent PowerBooks and low-end desktop Power Macs. During testing, I discovered some incompatibilities with a particular Matsushita CD-ROM drive, but a 2.0.1 update,



**Explore Uncharted CDs** CD-Copy not only gives a hierarchical view of your data CDs but also provides detailed technical information about the disc.

which fixes this problem, should be available by the time you read this.

In addition to having file and data-retrieval features, CD-Copy can double as a great tool for satisfying your curiosity. Provided that your CD-ROM drive allows it, CD-Copy can display precise statistics and additional information about a CD, including exact start and finish time of sessions on a CD or which software mastered it. Although this sort of information is only nominally useful for most users, it makes for interesting exploration.

In addition to grabbing files, folders, and tracks from CDs, CD-Copy can also duplicate an entire CD session into a single file. But although this feature lets you easi-

ly store a complete partition for later archiving, my testing uncovered a fairly large caveat for copying multiple audio tracks.

I copied three adjacent CD tracks into a single image file with CD-Copy and then used Adaptec's Toast software—originally an Astarte product—to burn CDs on an APS CD-R Pro drive. Unfortunately, the resultant disc didn't contain three tracks but instead a single track containing all three songs. Although this glitch isn't explicitly the fault of CD-Copy, it shows that sometimes even an intuitive user interface isn't enough to give you the result you *think* you'll get.

**Macworld's Buying Advice** Many of CD-Copy's features are available elsewhere, either as part of Mac OS 8 or within popular CD-R mastering software, albeit not necessarily as well integrated. CD-Copy is one of those tools you either desperately need or don't need at all. Its reasonable price makes it a good value, but this product's not for everyone.—STEPHAN SOMOGYI

**RATING:** ★★★ **PROS:** Displays interesting details; allows easy duplication of data CDs. **CONS:** Results aren't always what you expect; finicky about drives. **COMPANY:** Astarte (612/483-5338, [www.astarte.de](http://www.astarte.de)). **LIST PRICE:** \$99.

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Mac World 4/98

A-ER9



# Ray Gun

CLEAN UP DIRTY AUDIO IN A SNAP

ONE CRITICAL ELEMENT OF sound plagues the audio world more than any other: noise. Air conditioners, electrical ground loops, traffic, the hum of hard drives, computer fans—potential noise sources are as plentiful as they are hard to defeat. Luckily, Arboretum Systems' Ray Gun 1.0, a robust "denoiser" plug-in, comes at a price that puts it within reach of any audio enthusiast.

Named for its "point-and-shoot" operation, Ray Gun eliminates common audio foibles such as hiss, crackling, popping, hum, and broadband noise. The application works in real time, requires a Power Macintosh, and works either in stand-alone mode or as a plug-in to Adobe Premiere or any program that accepts Premiere plug-ins. It also works with the bundled HyperEngine, Arboretum's own plug-in environment.

Ray Gun runs in three modes: noise reduction, pop suppression, and rumble/hum filtering. You can enable each mode individually, depending on the requirements of the audio clip. In noise-reduction mode, Ray Gun analyzes an audio sample; it detects consistent, wide-frequency noise; and it



**Zap!** Ray Gun (seen here operating in Arboretum's HyperEngine application) puts a simple interface on complex inner mechanics.

attempts to attenuate those frequencies without affecting other frequencies. The pop-suppression mode fixes transient noise, such as crackles, clicks, and pops. Filtering mode gives you control over certain frequencies; the Rumble filter eliminates the low-frequency noise common to vinyl albums, while the 50- and 60-Hz filters reduce electrical hum. Output-level sliders let you make up for any loss in overall volume.

Used carefully, Ray Gun helps bring out the musical and audio detail of fairly mangled recordings. We were able to remove audio hiss that was fully half as loud as the actual harmonic content of a musical

passage, with very little distortion of the music. Spoken-word passages also held up very well. Using the noise-reduction feature requires the most care; certain passages may require some high-frequency equalization to restore some of the original brightness.

Ray Gun may introduce volume "pumping" or a tremolo-like warbling to an audio clip if its parameters are set too high. The sliders are occasionally disabled when the application is used as a plug-in to HyperEngine; reopening or reapplying the effect seems to clear up the problem. The software also lacks printed documentation, though the installer CD-ROM comes with extensive HTML documentation.

**Macworld's Buying Advice** Ray Gun is inexpensive, operates within a wide variety of host applications, and yields astounding results. If you've been stashing away your outdated vinyl LPs, it's time to haul them out of the closet and blast them with Ray Gun.—NATHAN MOODY AND DAVID BIEDNY

**RATING:** **PROS:** Great one-button audio noise reduction; significantly improves processed audio quality; simple interface. **CONS:** Minor bugs; lacks printed documentation. **COMPANY:** Arboretum Systems (415/626-4440, [www.arboretum.com](http://www.arboretum.com)). **LIST PRICE:** \$99.

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**1997**

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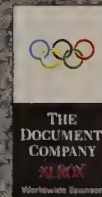
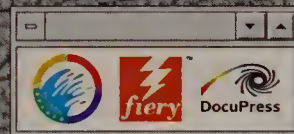
It's got to be perfect, but color output costs too much.

What you say about color printing can't be printed here.

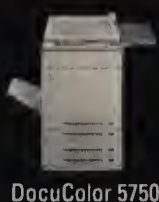
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DocuColor 5750

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# Save Your Mac!

BY HENRY BORTMAN

## Surefire Strategies to Survive and Thrive in a Windows World

have to deal with Windows. Maybe your IS department is threatening to put a PC on your desk because your Mac doesn't conform to the company's network standards, or you're seeing more and more of your customers walk in the door with PC-formatted disks in hand. Whatever your personal Windows nightmare, one fact remains—the best way to ensure that your Mac survives is to learn to coexist. To navigate the cross-platform labyrinth, you need to know what problems to watch out for and how to solve them. That's just what this *Macworld* expert guide will help you do.

SOONER OR LATER IT'S BOUND TO happen. You can avoid it. You can try to fight it. But eventually, you're gonna

### Scenario #1: Dealing with a PC Disk

A client just brought you an Iomega Zip cartridge with a bunch of text files and photos. You pop in the cartridge, but after it mounts on your Mac's desktop, all the files have the same generic icon that simply says "PC." They also have unintelligible names like TOTALR~1.DOC and TOTALR~2.DOC. You've got three problems here, one of which Apple has already solved (lucky you).

**Mounting a PC Disk** This is the part you don't have to worry about. Apple bundles with the Mac OS a control panel called PC Exchange that can mount (recognize and display on the desktop) DOS-formatted disks. If your client's PC disk







doesn't mount, check to see that PC Exchange is present in your Control Panels folder and turned on. If you still can't get the disk to mount, check with the person who gave it to you to see how he or she formatted the disk and what operating system he or she is using.

## Tell your Windows buddies to give files short names if you're going to shuffle them back and forth

If you're using third-party cross-platform software (for recommendations and ratings, see the feature "Mac Life Preservers," elsewhere in this issue), you may encounter other glitches. For instance, if you use DOS Mounter 95, from Software Architects (\$100; 425/487-0122, [www.softarch.com](http://www.softarch.com)), your Mac may eject PC-formatted Iomega Zip or Jaz cartridges. Here's a tip: Rename the Iomega Driver file in your Extensions folder nIomega Driver. This will make it load *after* DOS Mounter's MultiMounter extension and will clear up the problem.

Some of the newest PC models come with a version of Windows 95 known as OSR2, which offers users an option to format disk volumes larger than 2GB by using a disk format known as FAT32. This new format isn't widely used today, but when Microsoft releases Windows 98 and NT 5.0 (which will also offer FAT32 as a formatting option), it will become more prevalent. The version of PC Exchange that comes with Mac OS 8.0 (version 2.1.1) can deal only with the older FAT16 standard. PC Exchange 2.2, which is bundled with Mac OS 8.1, can recognize FAT32-formatted disks, but you *must* be running Mac OS 8.1 to use it.

**Handling Long File Names** So what about those weird file names on your client's Windows disk? Unfortunately, that's a sign that Apple's PC Exchange software hasn't caught up with Windows 95 and NT 4.0.

These operating systems support file names up to 253 characters long. But as of Mac OS 8.0, PC Exchange (version 2.1.1) could handle only the older DOS "8.3"-style file names, which can be only as long as 12 characters and typically take the form of 8 characters

followed by a 3-character extension.

For each file on a DOS-formatted disk, Windows 95 and NT 4.0 store both the newer, long file name and a truncated, 8.3 version of that name. PC Exchange 2.1.1 recognizes only the truncated version. This can result in file

names that, at best, are difficult to distinguish from one another and that, at worst, look like complete gibberish.

You've got two choices for dealing with this. The least-expensive solution—if you're already running Mac OS 8—is to upgrade to 8.1. (The 8.1 up-dater is available free from Macworld

Online, [www.macworld.com/more/](http://www.macworld.com/more/).) This new version of the Mac OS ships with PC Exchange 2.2, which is savvy to Windows' long file names and properly displays Windows file names up to 31 characters long.

Did someone say 31 characters? What happened to 253? Sorry. Even though Windows 95 and NT 4.0 can support longer file names, the Mac OS 8.1 Finder still supports names only as long as 31 characters. So you might want to tell your Windows buddies to limit their file-name lengths if you're going to shuffle files back and forth.

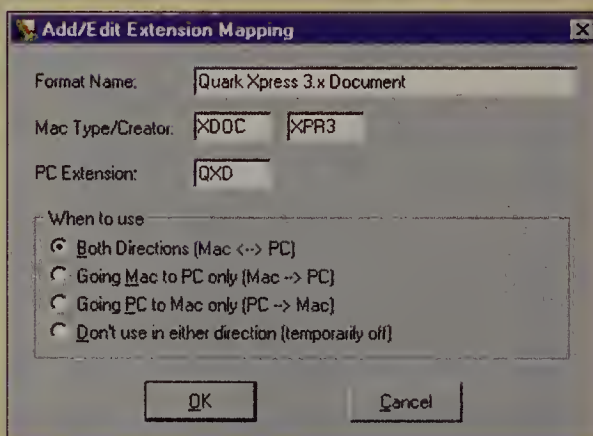
The other alternative is to purchase DOS Mounter 95 1.1. It can recognize and display Windows' long file names even without requiring you to upgrade to Mac OS 8.1. It, too, is limited by the Mac OS to displaying 31-character file names. The current version of DOS Mounter also doesn't support FAT32-formatted disks, although Software Architects plans to fix this in a forthcoming version.

By the way, neither PC Exchange nor DOS Mounter actually *changes* the names of the files on a DOS-formatted disk; they just display truncated names in the Mac Finder.

**Displaying Proper Icons** The Mac OS and Windows use different methods to decide what type of icon to display for each file. File extensions are there for a good reason—they're how Windows knows what each file's internal data format is and which application to open it with when you double-click on it. A file whose name ends in .DOC, for example, is a Microsoft Word document.

The Mac OS uses a different scheme. It assigns two invisible four-character "labels" to each file, known as the file's *type* and *creator*. Unfortunately, your Mac doesn't know how to

### Across the Great Extension Divide



WINDOWS PCS AND MACS RECOGNIZE FILES IN different ways. PCs look for *extensions* tacked onto file names—such as .tif if the file is a TIFF image—and Macs look for invisible type and creator labels. To successfully share files, you need to let the different platforms know what's what. You can solve this problem of *extension mapping* on the Mac side with Apple's PC Exchange (top) and on the Windows side with DataViz's MacOpener (bottom).



## Unruly Icons

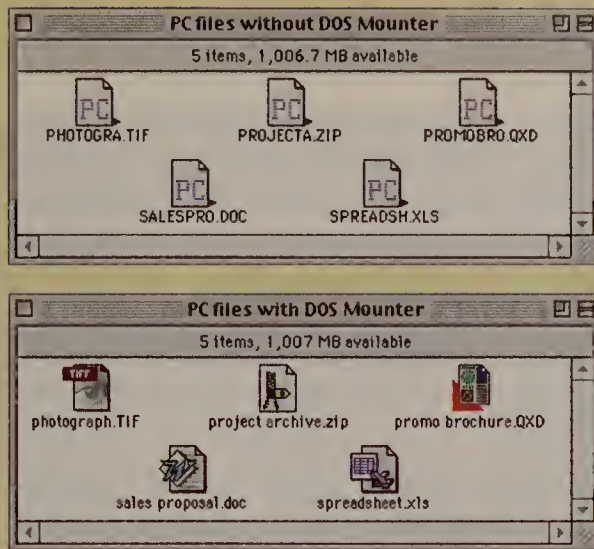
interpret Windows file extensions without help. Hence the funky icons. The solution is to build an *extension map* on the Mac that associates the proper Mac file types and creators with their Windows file-extension equivalents.

PC Exchange and DOS Mounter 95 can both help you with extension mapping, but whichever product you choose, you'll probably have to do some work yourself. PC Exchange comes with a pathetic built-in extension map that simply maps .txt files to SimpleText ASCII text files. This means you'll have to manually enter all the mappings you need to deal with—at least the first time. Once you've built your extension map, PC Exchange creates a preferences file containing all that data. By copying this file from one Mac to another, you can duplicate your extension map with minimal effort.

DOS Mounter 95 has the opposite problem. It comes with a fairly comprehensive built-in extension map. The big drag is that if you do have to update it, you'll have to do so separately on each Mac in your operation.

**Extension-Mapping Aids** Many shareware utilities can also help you deal with extension mapping and other cross-platform-compatibility issues. All of them are available from Macworld Online.

*Macworld* has created an exclusive PC Exchange preferences file that con-



ANOTHER PROBLEM YOU'LL FACE IF YOU don't deal with extension mapping is generic file icons (top) that you can't double-click on to open. Without help, Mac OS 8's built-in software, PC Exchange 2.1.1, can't display proper icons or the long file names of Windows-based files. You can fix these problems by installing Software Architect's DOS Mounter 95 (bottom) or by upgrading to Mac OS 8.1.

they'll behave properly on Windows. Daniel Azuma's FileTyper (\$10; [www.ugcs.caltech.edu/~dazuma/filetyper/index.html](http://www.ugcs.caltech.edu/~dazuma/filetyper/index.html)) gives you a quick and easy way to examine or set the type and creator for individual files.

**Mounting Removables** So, by now you've managed to deal with the file-naming and extension-mapping issues successfully. You've opened your client's Word and TIFF files, and you've created

use Zip or Jaz cartridges, you can download the free Iomega Tools 6.0 from Iomega's Web site ([www.iomega.com](http://www.iomega.com)). Unlike previous versions of this utility, Iomega Tools 6.0 lets you reformat Mac-formatted Zip and Jaz cartridges for DOS from your Mac. At press time, the 6.0 version was in beta.

If you have DOS Mounter 95, you've got another option. DOS Mounter 95 comes bundled with a stand-alone utility called MultiFormatter, which can reformat a Mac-formatted disk for DOS. (A handy plus is that it also lets you create Mac and DOS partitions on the same disk.)

If you use SyQuest cartridges, the drill is slightly different. Remove your cartridge, and restart your Mac with extensions off (by holding down the shift key at start-up). Reinsert the cartridge, and launch SyQuest's MacUtil utility (available from the company's Web site, at [www.syquest.com](http://www.syquest.com)). Click on the Quick Erase button. This will remove Mac formatting from your cartridge. When you restart your Mac with extensions on, you should be able to format the cartridge for DOS.

## Out of the box, Windows 95 and NT can't even mount a Mac-formatted disk

tains extension mappings for many of the market's most popular productivity and graphics applications. Ian Szekely's Type/Creator Database 2.9 (\$10; [www.geocities.com/SiliconValley/Bay/5677/](http://www.geocities.com/SiliconValley/Bay/5677/)) also provides an exhaustive database of extension mappings.

Another utility, Cross Platform, from Sig Software (\$25; [www.sigsoftware.com](http://www.sigsoftware.com)), can help you analyze your Mac files and tell you which Windows application (and, if necessary, which file-format-translation filter) is required to read it on a PC. NameCleaner (\$20), also from Sig Software, helps you check and fix your Mac file names so that

her brochure. It's too big to fit on the client's overstuffed Zip cartridge, but that's no big deal. You can just put it on a spare Mac-formatted one. Right?

Actually, if you mount a Mac-formatted disk (other than a floppy), you'll find that DOS formatting isn't an option. What gives? Alas, PC Exchange will *reformat* removable disks with DOS formatting only if they're *already* DOS-formatted. If they're Mac-formatted, you're stuck. The new PC Exchange 2.2 won't fix this either.

There are several workarounds. The first is to buy some spare removable cartridges preformatted for DOS. If you

## Scenario #2: Mac Disks on a PC

If you're the only Mac designer your client has to deal with, she might reasonably expect her DOS-formatted disks to be the standard. But if she exchanges files with several Mac users, she might be better off taking care of the problem herself.

The problem is that out of the box, Windows 95 and NT 4.0 can't even *mount* a Mac-formatted disk. Without the addition of third-party software, all Windows PC users get when they put your Mac-formatted cartridge into a PC is a warning that the disk is "not formatted" and an invitation to erase it.

### Mounting Mac Disks on a PC

There are several utilities that *do* let a PC user mount Mac disks on a PC (see



the feature "Mac Life Preservers," elsewhere in this issue). Our favorite is MacOpener 3.0, from DataViz (\$59; 203/628-0030, [www.dataviz.com](http://www.dataviz.com)). It's pretty straightforward: You install it, it works. It lets Mac disks show up in Windows' My Computer window just like DOS disks. MacOpener also lets PC users

save and name their files. That way, when the files show up on the Windows side, they will be handled properly.

MacOpener offers another solution to this problem. Like other cross-platform file-management utilities, it too contains an extension-mapping table. This feature has an option that, based on

tridges back and forth between the two platforms. But if your computers are networked, an additional set of file-sharing options is available to you.

Using a network to share files cross-platform has an added benefit: it lets Macs access printers connected to Windows PCs and Windows networks and lets Windows PCs access printers connected to Macs and Mac networks.

By transferring files cross-platform over a network, you avoid many of the problems associated with disk swapping but you encounter a whole new set of challenges. You see, just as Macs and Windows PCs deal with disks, file names, and icons differently, they also use different schemes for file sharing.

**Your First NT Server** One of the advantages that Mac users have long claimed for their platform is the ease with which they can share files and printers over a network. Apple has long offered easy-to-maintain AppleShare servers, dedicated Macs running special software that allow small workgroups of Mac users to share files without requiring the expert services of a network manager. In System 7, Apple also built in *peer-to-peer* file sharing, which lets Mac users exchange files directly with one another over a network without having to set up and access a dedicated AppleShare server.

But Mac OS file-sharing performance degrades quickly as the number of users sharing files grows, and even dedicated AppleShare servers don't hold up well if you typically pass around loads and loads of multimegabyte files. For this reason, many Mac users today are looking to Windows NT Server 4.0 as an alternative to AppleShare servers.

**NT Services for Macintosh** If all you're looking to do is replace your AppleShare server with a higher-performance NT Server, you may be satisfied with NT Server's built-in Services for Macintosh (SFM). NT Server 4.0 comes with AppleShare file-sharing and printer-sharing capabilities

## By transferring files over a network, you'll avoid most disk-swapping problems but face new challenges

reformat DOS-formatted disks for the Mac, including removable cartridges. MacOpener not only solves the Mac-disk-mounting problem but helps you deal with file naming and extension mapping as well.

**Mac File Names** Since Windows 95 and NT 4.0 support longer file names than the Mac OS does, any old crazy name you give a file on a Mac will behave itself on Windows, right?

Not quite. There are two file-name-related problems that Mac users who want to transfer files to PCs need to solve. The first is that Windows doesn't allow certain characters in file names that the Mac OS does allow. Specifically, backslash (\), slash (/), colon (:), asterisk (\*), question mark (?), inch marks ("), less than (<), greater than (>), and bar (|) are forbidden in Windows file names. Nothing disastrous will happen to the PC if a Mac file name does include these characters—MacOpener will just treat the file name as if it contained underscores instead—but it's probably best to avoid them.

**Extension Mapping, PC Style** The second issue is—you guessed it—file-name extensions. We covered this for the PC-to-Mac case, but it's also important to consider when files are going from a Mac to a PC. Remember, PCs don't know about Mac file types and creators. Windows relies on a file's three-character extension to figure out which icon to display for a file and which application to launch when a user double-clicks on the file. Unfortunately, Mac users don't typically append extensions to their file names.

One obvious way around this is for Macintosh users to train themselves to include file-name extensions when they

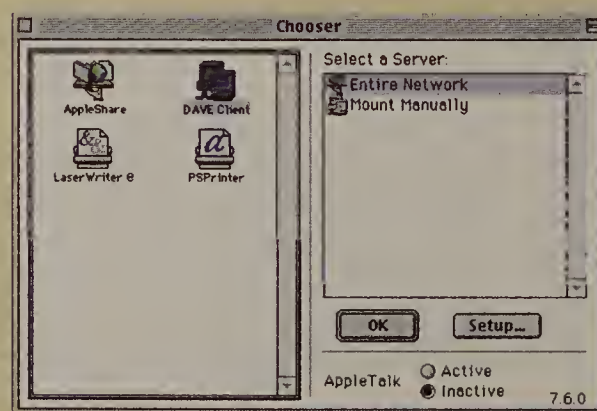
a Mac file's type and creator, automatically appends an appropriate extension.

These file-name changes are permanent. When you move the disk on which they reside back to a Mac, the extensions are still there. While this may annoy some Mac users who find the mere notion of consorting with DOS file-name extensions offensive, MacOpener's automatic appending does ensure that files behave themselves on the PC side, which—after all—is the point. (And if you really want to, you can turn this feature off.)

### Scenario #3: Mac Network Meets Windows Server

So far we've discussed sharing files between Macs and Windows PCs by shuffling floppies or removable car-

#### Welcoming Macs to the Windows World



EVEN IF YOU'RE ONE OF THE FEW MAC USERS in a Windows-dominated office, network file sharing doesn't have to be painful. If you're forced to abandon the Mac's built-in AppleTalk networking, Thursby Software Systems' Dave 2.0 can help. By providing a Chooser icon through which you can access shared Windows volumes, Dave makes the experience almost as Mac-like as using AppleShare.



built-in. By activating this option, you enable all the Mac users to access and exchange files that have been designated as shared on the NT Server.

If your entire network consists of an NT Server running Services for Macintosh and a bunch of Mac *clients* (jargon for computer workstations that access files on servers), you don't have to worry about file names and extension mapping. Even though your files are physically being stored on a Windows PC, the NT Server's SFM software stores file-type and -creator information for Mac files and doesn't require that you append extensions to your file names. From a Mac user's perspective, it's no different than accessing an AppleShare server.

A note of caution: When you first set up your NT Server, you'll be asked to choose between two disk formats—FAT or NTFS. FAT (file allocation table) is the standard DOS format; NTFS (NT file system) is NT's high-performance format. Make sure you pick NTFS for any volumes that you want to share, as FAT-formatted vol-



cided that the time has come for the Windows 95 PCs in the sales department to become full citizens on the Mac network. Or maybe your company is buying new computers and just plain wants to save a few bucks—after all, at this point Windows PCs are still usually cheaper than Macintoshes.

However it happens, the time may

come when you find that your little group of Mac users (who were getting along just fine using Mac OS's built-in peer-to-peer file sharing, thank you) are now supposed to figure out how to include Windows users as well.

PC MacLAN makes it equally simple for Windows PC users to share a portion of their local disks with Mac users. All they have to do is click on a folder icon with the right mouse button, select the AppleTalk Sharing item from the pop-up menu that appears, and fill in the relevant information about

what to call the shared volume and who has permission to access it. Mac users on the same network can then access this shared folder just as they would folders shared by other Mac users.

#### **File Names and Extension Mapping**

As is the case when you move Windows PC and Mac files back and forth on floppies, when you share cross-platform files across the network, you're going to have to deal with file names and extension mapping. Otherwise, files will not appear with correct icons and you won't be able to double-click to open them.

When you use PC MacLAN, you build your extension map on the Windows side of the fence. You can move this information from one Windows PC to another by arcane means—mucking around in the Windows Registry Editor for the Windows 95 product, editing a tab-delimited text file for the NT product, and then uninstalling and reinstalling the PC MacLAN software. But if I were you, I'd stick to the reliable but tedious method: entering your updated extension-mapping information on each Windows PC separately.

Be forewarned that PC MacLAN's extension mapping doesn't help Windows PC users display proper icons for Mac files. For that, Mac users have to get in the habit of appending DOS extensions to their file names.

**A Word of Caution** PC MacLAN's purpose is simply to extend Mac OS file sharing to Windows 95 and NT 4.0 users, not to function as industrial-strength server software. Take into

## Once one Windows PC shows up on your network, others may follow, and not necessarily as servers

umes can't be shared.

Also, although NT Server's Services for Macintosh lets Mac as well as Windows PC clients access its shared files, it doesn't provide any way for Macs and PCs to exchange files directly with each other. In other words, it doesn't offer support to peer-to-peer file sharing across platforms.

### Scenario #4: PCs Proliferate but Macs Rule

Once the first Windows PC shows up on your network, others may follow—and not necessarily as servers hidden away in a closet, masquerading as AppleShare servers. Maybe your organization has decided to bring a couple of NT workstations in-house to run specific applications (such as 3-D-rendering apps) that scream on NT but are sluggish on the Mac. Maybe one of the higher-ups in your company has de-

come when you find that your little group of Mac users (who were getting along just fine using Mac OS's built-in peer-to-peer file sharing, thank you) are now supposed to figure out how to include Windows users as well.

**Peer-to-Peer File Sharing** If Macs are the dominant platform and AppleTalk is the established network but a few PCs want in, you need to find a way to let Windows PC users join in the Mac peer-to-peer file-sharing experience.

We recommend the versatile PC MacLAN, from Miramar Systems (\$199; 805/996-2432, [www.miramarsys.com](http://www.miramarsys.com)). Miramar sells different versions of the product, one for Windows 95 and another for Windows NT 4.0 (Workstation or Server). When installed, the program enables a PC to participate in Macintosh-style peer-to-peer file sharing over an AppleTalk network.

With PC MacLAN running, Windows PC users can see shared Mac vol-



account that only ten AppleTalk clients can log on simultaneously to a Windows PC running PC MacLAN.

Although PC MacLAN's NT version will run on either NT Workstation 4.0 or NT Server 4.0, using the Services for Macintosh built into NT Server is a

the Chooser, using the Dave Client icon, which functions much like the AppleShare icon. Or you can use Dave Access, which offers a richer set of connection and file-display options. Whichever method you choose, once you've mounted a shared PC volume,

type the *first* time it opens that kind of file. This means, for instance, that if you open a TIFF file before you build your extension map, TIFF files will forever display with generic icons, even after your map is built and in place.

The long and short of it is that you need to build your PC Exchange extension map first, before you start using Dave. And notice that I said PC Exchange (that's right, the application built into the Mac OS); I did not say DOS Mounter. That's the other little gotcha to be aware of if you use Dave. It can't access DOS Mounter's extension map; it can use *only* PC Exchange's.

From the Windows perspective, extension mapping is a nonissue, as long as Mac users cooperate. Dave doesn't install any software on the PC side, so it's up to the Mac types such as you to religiously append proper DOS extensions to all your file names. If you put the extensions there, Windows 95 and NT 4.0 will handle your files properly. If you don't, there's a chance that PC users will complain—and IS may come gunning for your Mac again.

## The Last Word

If you've been running for cover every time you see Windows lurking around the corner, it's time to face the facts. We're living in a cross-platform world. The prevalence of Windows doesn't necessarily mean you have to give up your Mac, but it does mean you're going to have to learn to get along with PCs. The tips we've offered here should provide you with a foundation on which to build a solution right for you.

Just remember: You may have to do a few things here and there the Windows way to keep your clients, or your boss, or the IS department happy, but if it means you still get to see "Welcome to Mac OS" every morning when you turn on your computer, there's still hope. **m**

HENRY BORTMAN is Macworld's senior technology editor.

## If you've been running for cover, now's the time to face the facts. We're living in a cross-platform world.

better way to go if your organization has lots of users who all need to access the same shared volume at the same time. Windows NT Workstation users integrating their PCs into Mac networks will find significant value in PC MacLAN, but it's doubtful you'd get much out of installing it on a Windows PC running NT Server.

## Scenario #5: Your Mac Fights for Its Life

This one is a Mac-o-phile's worst nightmare. Here's the scene: You work in the graphics department of a large company that's overwhelmingly dominated by Windows PCs. In fact, your little corner of the world is the last holdout for the Mac in the entire operation.

The IS department has been complaining to the top brass for years about wanting to get AppleTalk off the corporate network. As a result, the bean counters in accounting are threatening to get rid of your Macs and replace them with Windows PCs running NT Workstation. You've tried every argument you can think of to stall.

Well here's one more tack you can take. Tell them you want to install Dave 2.0 on your Mac. Dave, from Thursby Software Systems (\$119; 817/478-5070, [www.thursby.com](http://www.thursby.com)), like PC MacLAN, enables peer-to-peer file sharing between Macs and PCs. But instead of doing it with AppleTalk protocols, Dave uses Windows networking protocols. With Dave, not only will you fit in, but all the work is done on *your* end—no software at all is required on your IS department's precious Windows PCs.

Once installed, Dave gives you a couple of different ways to access shared Windows volumes. You can work from

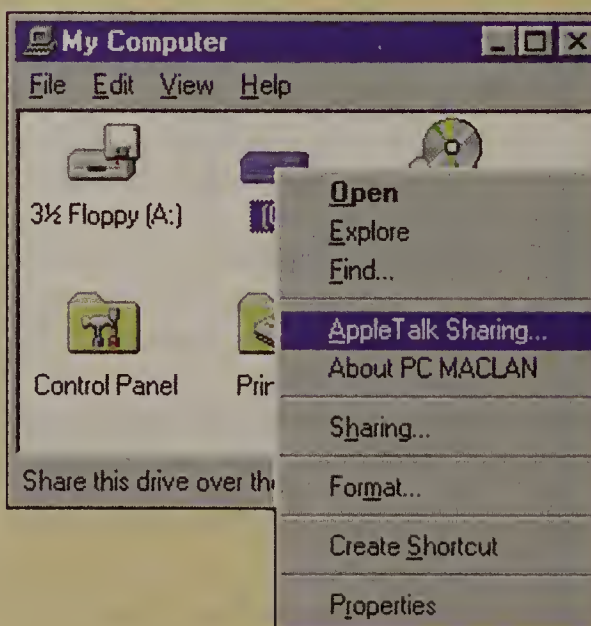
you can make an alias for it and avoid clicking through Dave Client or Dave Access in the future.

To share a folder on your Mac with Windows PC users (or other Mac users also running Dave), you use the Dave Sharing control panel. On your colleagues' Windows 95 or NT 4.0 PCs, your shared volume will show up in the Network Neighborhood alongside the items those PCs share with each other.

Dave does have a lot of little pieces, and if you're not used to Windows networking you can easily get lost. But if you stick to the basics, Dave is as straightforward to use as AppleShare.

When Dave displays the contents of a Windows directory, it uses the PC Exchange preferences file to do its extension mapping. Not surprisingly, there's a twist. Be warned: Dave *permanently* sets the icons it displays for a file

## Welcoming Windows to the Mac World



IF YOU NEED TO INTEGRATE A FEW WINDOWS PCs into your established group of networked Macs, Miramar Systems' PC MacLAN will help them fit in and smoothly join in file sharing directly from Windows' contextual menus.



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Circle 261 on reader service card



Essential  
Software to  
Stay Afloat  
in Cross-  
Platform Seas

# Mac Life Preservers

BY GALEN GRUMAN

LIKE IT OR NOT, WINDOWS PCS ARE PROBABLY A

part of your life, but you don't have to sink in a sea of cross-platform incompatibilities. With the right tools, you can not only stay afloat but also cruise easily in the cross-platform waters. In the feature "Save Your Mac!" (elsewhere in this issue), we talk about strategies and problem solving for mixed Mac and Windows environments. Here we'll help you find software that will turn those tactics into action. No matter how you deal with Windows PCs, there's almost certainly a software option that will fit your particular needs. In this comparison, *Macworld* explores and rates 25 products.

## Sharing Disks Successfully

The most common way to share with your Windows-using coworkers is to exchange files, whether you're swapping simple floppies or removables of other kinds. But there's a basic problem with cross-platform file exchange: the Mac and Windows operating systems use different methods of formatting and arranging files. As a result, disks typically won't mount, and even when they do, you can't double-click on file icons to open the files. Luckily, software tools can help you overcome this obstacle. The table "Breaking the Mac-PC Disk Barrier" sums up what's available for file exchange and how these tools rate with *Macworld*.







**Tools for the Mac** The Mac OS comes with a built-in tool for helping you handle Windows PC media and files: PC Exchange. But in System 7.X and Mac OS 8.0, PC Exchange supports only the DOS-style file names, not the long file names you might encounter when working with users of Windows 95 or Windows NT 4. The new PC Exchange 2.2 in Mac OS 8.1 now handles Windows' long file names. However, *Macworld* still recommends a more powerful solution: Software Architects' ([www.softarch.com](http://www.softarch.com)) \$100 DOS Mounter 95 1.1.

In addition to mounting PC media and handling long file names, DOS Mounter 95 lets you choose how Mac files are saved to PC media: DOS-style (perfect if you still work with people using Windows 3.1 or NT 3) or with long file names (if you work with people using Windows 95 or NT 4).

Unlike PC Exchange, DOS Mounter 95 also lets you format Iomega Zip cartridges and other removable media in PC format, and it gives you more control over how files are *mapped* from one platform to another. Mapping determines what icons your files get and thus what programs will open when you double-click on them. DOS Mounter 95 lets you set up independent file maps; so you could, for example, have files with the file extension .tif (for TIFF files) be mapped to an Adobe Photoshop TIFF file when opened on the Mac but mapped to a Corel Photo-Paint TIFF file when opened on a Windows PC.

DOS Mounter 95 includes a utility



common mapping in a workgroup).

Software Architects also offers FormatterFive 3.1, a \$195 utility that incorporates DOS Mounter 95 (renamed as Mac-PC Manager) and includes enhanced drive-formatting options. FormatterFive lets you work with IDE drives and create Universal Disk Format partitions (used on DVD-ROM discs).

**Tools for Windows PCs** Mac users aren't the only ones who can smooth the waters of Mac-PC file transfer. Three programs can help Windows PC users read your Mac media.

Our favorite is the \$59 MacOpener 3.0, from DataViz ([www.dataviz.com](http://www.dataviz.com)). It runs on Windows 3.1, 95, and NT 4.0 and has everything that most users need: the ability to read, write, and format Mac

Windows NT (though the forthcoming MacDrive 98, expected this spring, will). Like MacOpener, MacDrive 95 adds its Mac-formatting capabilities to Windows' contextual menus.

Once *Macworld's* top pick in this category, Software Architects' \$100 Here & Now 2.0 is showing its age. It covers the basics, but it doesn't support Windows NT and doesn't integrate Mac-disk formatting into Windows' contextual menus. Its one advantage is the ability to set up independent file mapping for Mac-to-PC and PC-to-Mac transfers, like its Mac cousin DOS Mounter 95 can. A new version expected this summer may again make Here & Now a top contender.

Avoid the truly awful Mac-in-DOS Plus 2.0, from NetUSA (formerly Pacific Microelectronics; [www.netusa.com](http://www.netusa.com)). Mac-in-DOS makes you use a time-wasting separate utility to copy files from floppies and removable drives to PC media, and vice versa. Mac-in-DOS is also terribly overpriced at \$129. Its only merit is that it automatically adds Mac file and creator types from unrecognized Mac files to its database, prompting you for the Windows file extension. However, this feature does not make Mac-in-DOS worth buying.

## Sharing Over a Network

Many people who use Macs are a minority surrounded by Windows PC-using departments. Exchanging floppies and other media helps you work with the Windows hordes, but it doesn't help you collaborate on the network, where most corporate data exchange happens. The software options here are trickier, mostly because networks are configured differently from company to company. The table "Making Macs and PCs Talk Directly" sums up the options and gives *Macworld's* ratings for each.

**The Future of Mac Networking** At some point, Apple plans to base its networking future on the platform-independent TCP/IP protocol rather than on the AppleTalk protocol. (The Mac OS now offers both, although AppleTalk is by far the more dominant.) The standardization on TCP/IP will make it easier to integrate Macs into PC-dominant environments, since Windows 95 and NT use TCP/IP. Of course, you'll still need soft-

## The network-sharing options are trickier, mostly because companies configure their networks differently

that lets you format SCSI-based removables and hard disks with Windows or Mac partitions. You can even partition a disk with one section formatted for Windows and one for the Mac OS. The application also includes the graphics-translation program GraphicConverter (covered later in this article). My only criticisms of DOS Mounter 95 are its price—\$100 is a lot, although the addition of GraphicConverter helps justify the cost for some users—and the fact that you can't copy its extension map to other Macs (to ensure

media; user-editable extension maps; and integration of Mac-formatting capabilities into Windows' contextual menus (see the screen shot "One-Touch Formatting").

If you need to work with Mac file resources or copy Mac disks from your PC while retaining their Mac formatting, you'll want the pricier (\$75) MacDrive 95 1.3, from Media4 Productions ([www.media4com](http://www.media4com)). It lets you use a PC as a disk-copying workstation for Mac media, freeing your Mac for more-interesting work. MacDrive 95 does not run under



# Can the Mac Really Do Windows?

IT HAPPENS TO NEARLY EVERY MAC USER

at some point: your boss or client insists that you use a Windows-only application, or the

new game you're dying to play isn't available for the Mac. What's a loyal Mac user to do?

There's no easy answer; it depends on your needs, your budget, and your desk space. But if you need to run lots of Windows applications on a regular basis, your best choice is to just buy a low-cost Windows PC. The alternatives are mediocre replacements, and *Macworld* recommends them only in specific cases.

**Software Emulation** If your budget is tight and you need to run only a few Windows applications, the cheapest option is a software emulator—a program that poses as an Intel-standard PC and lets you run DOS and Windows applications on your Mac. But this alternative is also *slow* and requires lots of RAM and hard-disk space—your Mac should have at least 32MB of free RAM and 250MB of hard-disk space available.

Macworld Lab tested Insignia Solutions' (408/327-6000, [www.insignia.com](http://www.insignia.com)) SoftWindows 95 4.0 (\$199; ★★) and Connectix's (415/571-5100, [www.connectix.com](http://www.connectix.com)) Virtual PC 1.0 with Windows 95 (\$149; ★★). Neither impressed us, especially given the changes in the emulation market since the last time we reviewed them. SoftWindows 95 ran our tests an average of five times slower than a poky 90MHz Pentium PC, and the cheaper Virtual PC crawled along at about half the speed of SoftWindows 95. Emulation-software performance can benefit from a few tweaks (see "Have Mac, Will Do Windows," January 1998), but be prepared for overall sluggishness.

**PC-Compatibility Card** If you need to devote significant time to running Windows applications, you need speed. If you have zero spare desk space or if your company won't support PCs, consider a PC-compatibility card—a PCI card that includes a Pentium-compatible processor and RAM dedicated to running DOS or Windows.

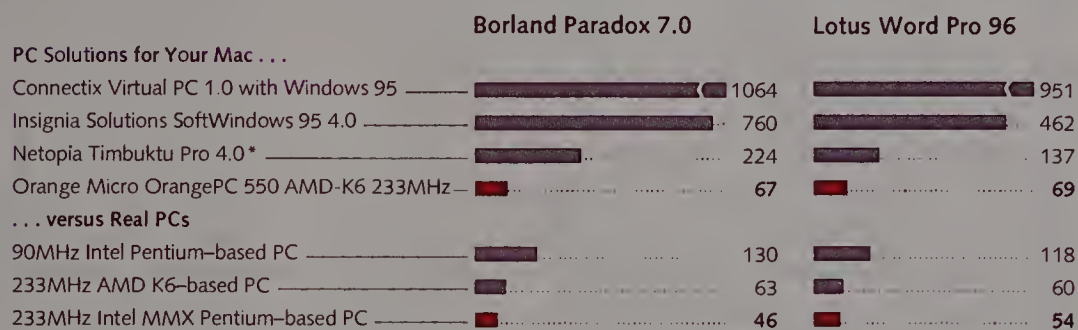
We tested Orange Micro's (714/779-



## Intel Inside, Mac Outside

Running Windows on your Mac is not usually the best solution. Software emulation was painfully slow in our tests, screen-sharing performance was only slightly faster, and PC-compatibility cards were speedier but not a good value. Your best bet? Buy a cheap PC.

■ Best result in test. All times are in seconds. Shorter bars are better.



\*Controlling a 200MHz Intel Pentium-based PC.

### Behind Our Tests

Tests were from Ziff-Davis's WinStone 97 benchmark. SoftWindows and Virtual PC were tested on a Power Mac 7300/200 with 64MB of RAM, of which 32MB of RAM were dedicated to Windows 95. The OrangePC 550 card had 32MB of dedicated RAM. Each PC had 32MB of RAM.—Macworld Lab testing supervised by Susan Silvius

2772, [www.orangemicro.com](http://www.orangemicro.com)) OrangePC 550 AMD-K6 233MHz card (\$1,549; ★★★). Its speed is impressive—nearly as fast as a \$1,800 233MHz MMX Pentium PC on both tests. But for what you spend on the card, you could buy a midrange Windows PC. Radius (408/541-6100, [www.radius.com](http://www.radius.com)) offers a lower-priced option with its Detente line of Pentium-based PC-compatibility cards, formerly sold by Reply as the DOS on Mac cards, but Radius declined to lend Macworld Lab evaluation units. Apple has discontinued its PC-compatibility cards.

**Screen Sharing** If your company has a spare PC on its network, you can use screen-sharing software to access it without making room for it on your desk. Screen-sharing software, such as Netopia's (510/814-5000, [www.netopia.com](http://www.netopia.com)) Timbuktu Pro 4.0 (\$139; ★★★½), displays a remote Mac's or PC's screen in a window on your Mac. You interact with normal Mac keyboard input. It's faster than emulation but is still relatively slow. This option is best for occasional PC use in a largely Mac environment; it also lets

multiple people share the PC, although only one person at a time.

### Macworld's Buying Advice

There's really no choice for most Macintosh users: bite the bullet and put a PC next to your Mac. Add connectivity software to exchange disks and data and use a switch-box to share a monitor, and you'll have the best of both worlds.

Assistant Lab Director SUSAN SILVIUS tests everything from networks to little black boxes.

### EDITORS' CHOICE

**None** For the vast majority of users, making room for a low-cost PC alongside your Mac is the most sensible way to run PC software. The other options are good only in limited, specific cases.

### REAL PRODUCTS REAL RATINGS

**Reviews you can trust** Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy.



## Breaking the Mac-PC Disk Barrier

PC-BASED SOFTWARE					PC OPERATING SYSTEMS				SUPPORTED MEDIA			
Company	Product	Mouse Rating	List Price	Phone Number	Runs from DOS Prompt	Runs from Windows 3.1	Runs from Windows 95	Runs from Windows NT 4.0	Floppies	Removable Disks	CD-ROMs	SCSI Hard Drives
DataViz	MacOpener 3.0	★★★★½	\$59	203/268-0030	●	●	●	●	●	●	● <sup>A</sup>	●
	Conversions Plus 4.0	★★★★	\$99	203/268-0030	●	●	●	●	●	●	● <sup>A</sup>	●
Media4 Productions	MacDrive 95 1.3	★★★★	\$75	515/225-7409	●	○	●	○	●	●	●	●
NetUSA	Mac-in-DOS Plus 2.0	★★	\$129 <sup>B</sup>	415/948-6200	● <sup>B</sup>	● <sup>B</sup>	● <sup>B</sup>	● <sup>B</sup>	●	●	○	○
Software Architects	Here & Now 2.0	★★★	\$100	425/487-0122	●	●	●	○	●	●	● <sup>A</sup>	●

MAC-BASED SOFTWARE					PC FILE OPTIONS				SUPPORTED MEDIA			
Company	Product	Mouse Rating	List Price	Phone Number	DOS/Win 3.1 (FAT16)	Win 95/NT 4 (FAT16)	FAT32 <sup>C</sup>	NTFS <sup>D</sup>	DOS and Long File Names	Floppies	Removable Disks	CD-ROMs
Apple Computer	PC Exchange 2.2 (Mac OS 8.1)	NA <sup>E</sup>	free <sup>E</sup>	408/996-1010	●	○	○	○	○	●	●	●
Software Architects	DOS Mounter 95 1.1	★★★★	\$100	425/487-0122	●	●	○	○	●	●	●	●
	FormatterFive 3.1	★★★★	\$195	425/487-0122	●	●	○	○	●	●	●	●

## Making Macs and PCs Talk Directly

					TYPE OF NETWORK				SUPPORTED PLATFORMS	
Company	Product	Mouse Rating	List Price <sup>F</sup>	Phone Number	Lets Macs Use PC Volumes	Lets Macs Use PC Printers <sup>G</sup>	Lets PCs Use Mac Volumes	Lets PCs Use Mac Printers	Windows 95	Windows NT 4.0
Citrix Systems	NTrigue 3.0	★★½	NA <sup>H</sup>	954/267-3000	● <sup>I</sup>	● <sup>I</sup>	○	○	client	server
Cooperative Printing Solutions	COPSTalk 2.5	★★★★½	\$159	770/840-0810	○	○	●	●	client	○
Microsoft	NT Services for Macintosh	NA <sup>J</sup>	free <sup>J</sup>	425/882-8080	● <sup>K</sup>	●	○	○	○	server
Miramar Systems	PC MacLAN 4.0 (Windows NT)	★★★★	\$249	805/966-2432	●	●	●	●	○	server/client
	PC MacLAN 6.2 (Windows 95)	★★★★½	\$199	805/966-2432	●	●	●	●	server/client	○
	PC MacLAN Remote (7.0)	★★★	\$179 <sup>L</sup>	805/966-2432	●	●	●	●	server/client	○
Netopia	Timbuktu Pro 4.0	★★★★½	\$139	510/814-5000	●	○	●	○	server/client	server/client
Thursby Software Systems	Dave 2.0	★★★★½	\$119	817/478-5070	●	●	●	●	server/client	server/client

**Editors' Choice winners in red.** ● = yes; ○ = no; NA = not available. <sup>A</sup> Can be configured to mount both volumes of Mac/PC dual-format CD-ROMs. <sup>B</sup> Must buy separate version for DOS/Windows 3.1, <sup>C</sup> Part of Mac OS 8.1. <sup>F</sup> Prices for single license; companies offer multiuser discounts. <sup>G</sup> Driver file or Infowave's PowerPrint required for non-PostScript printers. <sup>H</sup> Product recently sold to Citrix, which is repricing can be made accessible to Macs. <sup>L</sup> Also sold with PC MacLAN 6.2 as the \$249 Pro Pack.



OS INTEGRATION			
Uses	Contextual Menus	User Controls Use of File Extensions	Other Features
●	●	●	Displays Mac creator information for files.
●	●	●	Displays Mac creator information for files; converts file formats.
●	●	●	Displays Mac resource and creator information for files; MacDrive 98 to support NT 4.
○	○	○	A stand-alone utility that does not integrate into Windows' standard disk- and file-management functions.
○	○	○	Lets you map files to different programs based on direction of transfer (Mac to PC or PC to Mac).

SCSI Hard Drives	OS INTEGRATION		
	Uses Contextual Menus	Displays File Information	Other Features
●	○	○	Doesn't support removable media.
●	○	●	Allows direction-specific extension mapping; can create DOS partitions on SCSI drives.
●	○	●	Formats removable SCSI and IDE media with Mac and PC partitions, plus offers DOS Mounter 95 features.

SUPPORTED PROTOCOLS			
Mac OS	LAN Access	Dial-up Access	Other Features
client	TCP/IP	○	Application server for Windows NT, 95, and 3.1 programs; requires extra-cost Mac client.
server	AppleTalk, TCP/IP	to Mac (AppleShare IP)	Connects to AFP-over-IP servers, plus to any Macs on a LAN using Windows networking standards.
client	AppleTalk	○	Lets NT Server act as a shared file server for Macs and PCs; uses Mac's Chooser as client.
server/client	AppleTalk	○	Creates a peer-to-peer Mac/PC network; uses Mac's Chooser as Mac client and AppleTalk as Mac server.
server/client	AppleTalk	○	Creates a peer-to-peer Mac/PC network; uses Mac's Chooser as Mac client and AppleTalk as Mac server.
server/client	AppleTalk	to Mac (PPP on ARA 3.0)	If used with PC MacLAN 6.2, requires restarting between LAN and remote access.
server/client	AppleTalk, IPX, TCP/IP	○	Combination screen-sharing and file-transfer utility rather than a typical volume mounter.
server/client	TCP/IP	to Windows 95, NT (RAS)	Lets Macs and PCs with TCP/IP establish peer-to-peer networks; costs less than competitors.

Windows 95, and Windows NT 4. <sup>c</sup> Windows 95 OSR2, 98, and NT 5.0 disk-format type. <sup>d</sup> Optional Windows NT disk-format type. <sup>e</sup> the product. <sup>f</sup> Only within PC programs being run remotely from NTrigue server. <sup>g</sup> Part of Windows NT 4 Server. <sup>h</sup> Only NTFS volumes

ware that helps Windows PCs and Macs share the files over the network, since even if the two platforms use the same networking protocols, there are still the issues of conflicting file and disk formats and of different sharing protocols.

**Today's Solutions** At the very least, you want your minority Macs to access Windows PCs and printers. Both PC MacLAN, from Miramar Systems ([www.miramarsys.com](http://www.miramarsys.com)), and Dave 2.0, from Thursby Software Systems ([www.thursby.com](http://www.thursby.com)), do that well, but they tackle the problem from different starting points: you add PC MacLAN to your Windows PC, while you add Dave to your Mac. If you have more Macs than PCs, it makes sense to use PC MacLAN. If PCs dominate, Dave is the better choice.

**Best Tools for a PC Minority** By adding AppleTalk networking functionality to Windows, PC MacLAN makes any Windows PC into a file and print server for Macs, and it lets the PCs see Macs with file sharing turned on as file and print servers. There are separate versions for Windows 95 (version 6.2, \$199) and Windows NT (version 4.0, \$249), as well as a Windows 3.1 version (5.5), which Miramar is giving free to K-12 schools (it's no longer sold commercially). Miramar would do well to sell these as one product for either platform, to ease the burden of IS managers dealing with Windows 95 and NT systems on the same network.

If you need to access a Mac network remotely—from your Windows notebook, for example—there's just one product that can help: Miramar's PC MacLAN Remote (version 7.0) for Windows 95. The company has no plans for an NT version of PC MacLAN Remote, because Microsoft plans to add this capability in Windows NT 5.0, due out in late 1998 or early 1999.

PC MacLAN Remote has two flaws. It's expensive (\$179), and you have to restart your PC each time you want to switch your connection (between remote and LAN cross-platform access) if you use PC MacLAN Remote with PC MacLAN 6.2. (Miramar sells the two products bundled together for \$249 as the PC MacLAN Pro-Pack.) Miramar says it is working on an upgrade that won't require such restarting.

A bug in the various PC MacLAN products can prevent America Online users from seeing their network adapters when configuring the Miramar network settings in Windows' Network control



panel. You can use keyboard arrow keys to scroll through the pop-up menu of adapters until you find the hidden network adapter; the company plans to have a fix on its Web site by the time you read this.

All versions of PC MacLAN smoothly integrate into Windows, making Mac volumes and Mac printers accessible through the standard Network Neighborhood interface like any networked PC or PC printer. My only criticism of the PC MacLAN family is its high cost: prices range from \$179 to \$249 depend-

ing, PC users will see Macs and Mac printers through the standard Windows Network Neighborhood interface and Macintosh users will see PC volumes through the Chooser.

At \$119, Dave is a much cheaper buy than PC MacLAN, and Dave supports all flavors of Windows in one program. But PC MacLAN is much simpler to set up and doesn't have the one-network-at-a-time limitation, because it is PC-based. I prefer PC MacLAN because it has fewer hassles, but Dave's complexity is

.com). Its support of the Mac's new TCP/IP and AppleTalk File Protocol-over-IP functions means you can connect PCs to Mac-based Internet servers, which Web publishers in particular may find handy. It's also easier to set up than Dave.

## Running PC Software Over the Network

Many Mac users in large companies need access to central resources, such as files and printers, and PC MacLAN and Dave both allow such access. But if you also want to run a few Windows programs on your Mac, you'll need a separate solution. You could get a PC Card or emulation software—as the sidebar, “Can the Mac Really Do Windows?” describes—but there are other options too.

**The Best Choice** The simplest option is the \$139 Timbuktu Pro 4.0, from Netopia (formerly known as Farallon Communications; [www.netopia.com](http://www.netopia.com)). This software lets you remotely control a Mac or a Windows PC from another workstation. What's particularly useful about this is that the system being controlled does not have to be the same platform as the one controlling it, so you can run Windows programs in a Mac window or vice versa. Timbuktu also provides file exchange and basic messaging (such as chat).

**Things to Avoid** A more complex possibility is NTrigue 3.0 (pricing was unavailable at press time), formerly from Insignia Solutions but recently sold to Citrix Systems ([www.citrix.com](http://www.citrix.com)). NTrigue's application server runs on Windows NT, which means that multiple computers, be they Macs, PCs, or Unix workstations, can simultaneously run programs that reside on the NT server.

Besides other limitations, NTrigue is based on an outdated version of NT—3.5—that won't run most current Windows 95/NT software, and the NT 3.5 interface is so awful that

## Practically every popular program is cross-platform now, so there's less need for special file-translation tools

ing on the version you buy, compared with \$119 for Dave.

**Best Tool for a Mac Minority** The Mac-based Dave uses the Mac's native TCP/IP and adds Windows' NetBIOS protocol to give the Mac the appropriate networking protocols to connect to a Windows 3.1, 95, or NT PC. Many Mac users will appreciate that Dave doesn't require any software installation on the PCs, so you can connect your Macs without the help of your IS staff.

But don't get too independent: configuring Dave requires details about the Windows networking configuration on the PCs you're working with. You'll likely need a PC pro's help. For those not comfortable with nitty-gritty networking, PC MacLAN is far easier to set up.

Dave's only significant design drawback is that it relies on PC Exchange's extension mapping to display icons of files across the network—this is unfortunate if you're using DOS Mounter 95, which we recommend over PC Exchange.

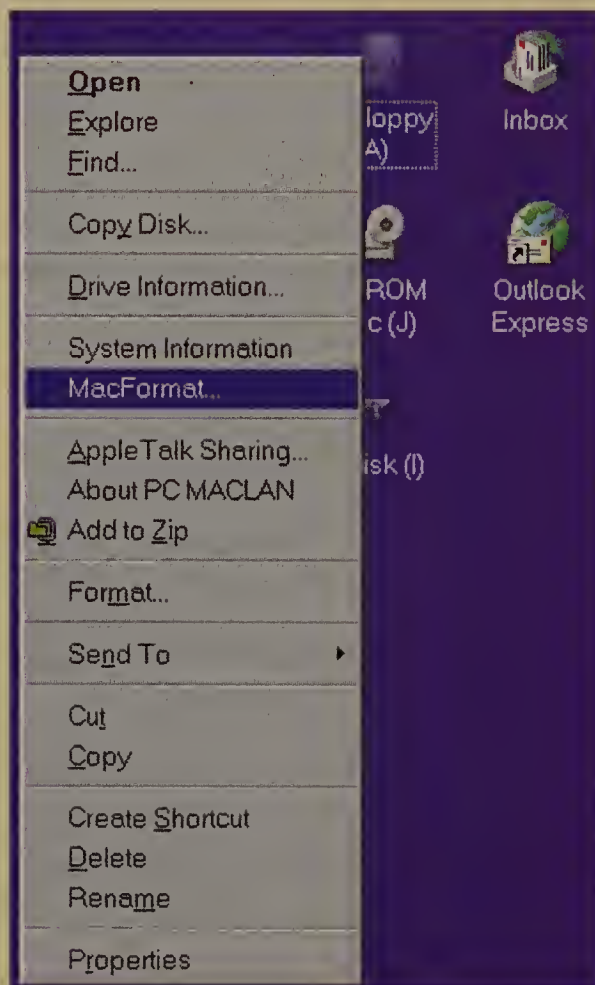
Dave also suffers from a limitation of the Mac OS's networking implementation: you can have only one active TCP/IP connection. If you are using Dave to connect to a PC and want to dial in to an Internet service provider, you'll have to disconnect from the network, change your TCP/IP control panel's configuration to a dial-up connection, restart your Mac, and then dial the Internet connection. Apple has said for several years that it will fix this problem but still hasn't done so.

Once you have Dave up and run-

ing, PC users will see Macs and Mac printers through the standard Windows Network Neighborhood interface and Macintosh users will see PC volumes through the Chooser.

**Other Options** Although most people will prefer products such as PC MacLAN and Dave that provide bidirectional Mac-PC networking, some people might consider the \$159 PC-to-Mac-only COPSTalk 2.5, from Cooperative Printing Solutions ([www.copstalk](http://www.copstalk)

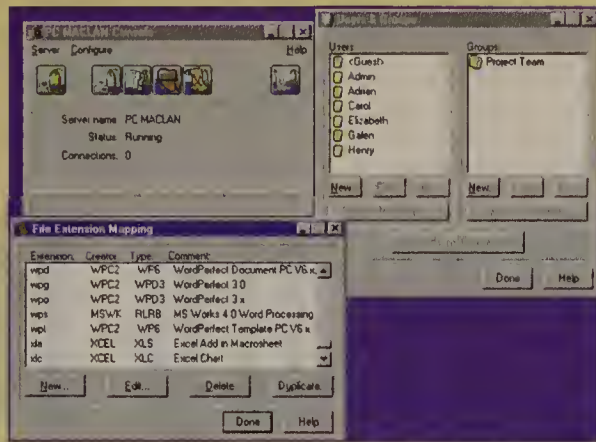
### One-Touch Formatting



MACOPENER 3.0 AND MACDRIVE 95 1.3 BOTH add Mac-disk-formatting capabilities into Windows' contextual menus.



## AppleShare on a Windows PC



MIRAMAR'S PC MACLAN FOR WINDOWS PCS mimics standard AppleShare features, such as users and groups. It also adds a utility that matches PC file extensions to Mac creator and file types, which allows file icons to display properly.

most Mac users (and many NT 4 users) will blanch the first time they see it. NTrigue routinely crashed when installing software from a CD-ROM or a floppy disk. Although NTrigue lets multiple users run programs remotely at the same time (Timbuktu lets only one person at a time), that's not a sufficient advantage to outweigh its current weaknesses.

## Essential Utilities

However you connect your Macs and PCs, there are a few utilities you'll find essential to have.

**Printer Support** All the network-based file-exchange products reviewed here support the use of printers on the server platform, but that's a sure thing only when the printers are based on Adobe PostScript, since both the Mac and Windows support it. If you have non-PostScript printers that your Mac needs to access via a network, you'll need PowerPrint 4.0 (\$99; ), from Infowave (604/473-3600, [www.infowave.net](http://www.infowave.net)). See *Reviews* in this issue for details.

PowerPrint adds drivers for most Windows PC printers, and this latest version includes a new cable with which you can connect a Mac's serial port to a PC printer's parallel port, allowing you to work with parallel-port-only PC printers. Infowave also has a multiuser version called PowerPrint Pro 4.0 (\$199; ).

**File Compression** The standard program for file compression on the Mac is Aladdin Systems' (408/761-6200, [www.aladdinsys.com](http://www.aladdinsys.com)) StuffIt 4.05 (\$99; ), while on the PC, the standard format is PKZip, which is supported by several programs.

Fortunately, StuffIt can decompress PKZip files and Aladdin offers a free utility called StuffIt Expander for Windows that lets you decompress StuffIt files on a PC. The best file-compression utility for Windows, the shareware WinZip 6.3 (\$29; ), from Nico Mak Computing ([www.winzip.com](http://www.winzip.com)), can also decompress StuffIt files.

Unfortunately, StuffIt can't create PKZip files and WinZip can't create StuffIt files. But the shareware ZipIt

1.3.8 (\$15; ½) can create PKZip files on your Mac. This easy-to-use program from Tom Brown (718/268-1240, [www.awa.com/softlock/zipit/zipit.html](http://www.awa.com/softlock/zipit/zipit.html); available through Macworld Online, [www.macworld.com/more/](http://www.macworld.com/more/)) mimics StuffIt's interface.

**File Translation** Practically every popular Mac and Windows program is cross-platform, so the need for file translation has greatly diminished. Most major programs even read their competitors' formats.

However, if you deal with older formats (particularly those of older word processors and spreadsheets), you may find DataViz's translation software exactly what you need. The Mac-based MacLinkPlus/Translators Pro 9.7 (\$149; ½) will translate most now-popular and once-popular file formats from Mac and Windows. On the PC side, DataViz offers Conversions Plus 4.0 (\$99; ), which bundles MacOpener 3.0 with a PC version of MacLinkPlus/Translators Pro.

For translation of graphic vector formats, the Mac-based Transverter Pro 3.2 (\$399; ), from TechPool Software (216/291-1922, [www.techpool.com](http://www.techpool.com)), is an essential tool. Also handy is the shareware GraphicConverter 3.1 (\$35; ½), from Germany's Lemke Software (49 5171-72200; available from Macworld Online), which is easier—and cheaper—to use than Photoshop if you just want to translate bitmap and vector formats.

## Macworld's Buying Advice

Our Editors' Choice winners, combined with the relevant tools from the preceding "Essential Utilities" section,

will make for smooth sailing in a cross-platform environment. And although the prospect of integrating Macs and PCs is unsettling for many people, the good news is that you can do so without losing what makes the Mac special. In fact, these tools make it harder for someone to take your Mac away. **m**

Macworld's editor, GALEN GRUMAN, has worked in a cross-platform environment for 15 years, and his Mac and PC communicate smoothly.

## EDITORS' CHOICE

### Mac-Based Disk Exchange

**DOS Mounter 95 1.1** This utility gives you real control over how files are transferred. **Company:** Software Architects (425/487-0122, [www.softarch.com](http://www.softarch.com)). **List price:** \$100.

### PC-Based Disk Exchange

½ **MacOpener 3.0** Seamless integration into Windows 3.1, 95, and NT makes this the best bet for accessing Mac files on a PC. **Company:** DataViz (203/268-0030, [www.dataviz.com](http://www.dataviz.com)). **List price:** \$59.

### Network-Based File Sharing

½ **Dave 2.0** Once configured, this Mac-based program provides seamless peer-to-peer networking between Macs and three versions of Windows: 3.1, 95, and NT 4. **Company:** Thursby Software Systems (817/478-5070, [www.thursby.com](http://www.thursby.com)). **List price:** \$119.

### **PC MacLAN 4.0**

### ½ **PC MacLAN 6.2**

Although pricey, the Windows 95 (6.2) and NT 4 (4.0) editions of PC MacLAN provide seamless peer-to-peer networking yet require little networking knowledge. **Company:** Miramar Systems (805/966-2432, [www.miramarsys.com](http://www.miramarsys.com)). **List price:** Version 4.0, \$249; version 6.2, \$199.

### Network-Based Application Access

½ **Timbuktu Pro 4.0** A jack-of-all-trades, this program lets you remotely control other systems, run software, share files, and even send electronic notes. **Company:** Netopia (510/814-5000, [www.netopia.com](http://www.netopia.com)). **List price:** \$139.

## REAL PRODUCTS REAL RATINGS

**Reviews you can trust** Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy.



# Windows Beauty Tips

Help Your  
Windows PC  
Discover  
Its Inner Mac



BY GALEN GRUMAN  
AND INGALL W. BULL III

can see the before and after in the screen shots on the facing page. You don't need to do all the steps—just pick the ones that give you the degree of Mac-ness you want.

## Make It Work Like a Mac

- **Move the Start menu to the upper-left-hand corner of your screen.** The Windows Start menu is

IF THE WINDOWS INTERFACE WERE YOUR BLIND DATE, YOU'D probably describe it as having a "good personality." However, all is not lost in this beauty contest: it's amazing what a little Mac makeover can do for Windows' click appeal. Believe it or not, even if you have to use a Windows machine, you *can* make it look and—to a certain extent—act like a Mac. Hope

springs from the fact that you're not the first Mac user who's had to use Windows. Those who went before you created some nifty tools to ease your pain. There's a bunch of shareware that brings more of the look-and-feel of the Macintosh to Windows. You'll have more success customizing a Windows 95 PC than one running Windows NT, but there's hope for NT users too.

All the software mentioned here is free, unless otherwise noted, and is available from Macworld Online at [www.macworld.com/more/](http://www.macworld.com/more/) or at <http://mac95.home.ml.org>. The installation instructions that come with the software are misleading, so be sure to read *Macworld's* instructions first. Finally, only a few of these shareware packages work with Windows NT 4.0; unless we say something works with NT, assume that it does not.

We walk you through the steps of a Windows makeover. You

the equivalent of the Mac Apple menu, so go ahead and put it where it belongs. All you have to do is click on the gray Task Bar where it's located and drag up toward the new location.

- **Sort out the menu bars.** One of the annoying side effects of moving your Start menu to the top of your screen will be that application menu bars will cover it because they expect the Task Bar to be at the bottom. To solve this problem, you can install the \$15 shareware program Shove-It, from Phil Hord. Shove-It shifts application menu bars down and out of the way. (If this doesn't seem to work, right-click on the Task Bar, select Properties, and make sure the Always on Top option is selected.)

- **Get your desktop icons in order.** First, move the My Computer, Network Neighborhood, and other Windows desktop icons to the right-hand side of your screen. Then open the My Computer and Network Neighborhood icons and drag the icons for your system's disk drives contained therein (3½ Floppy, Hard Disk C, Hard Disk D, CD-ROM Disc, and so forth) to the desktop; Windows will make aliases for them on your desktop, so you can position them like you would the Mac's standard drive icons.

- **Use the Mac's standard menus.** To get most of the standard menus that run across the top of your Mac—Apple, File, Edit, View, and Special—install WinMac. This shareware program reorders Windows functions to match the order of their



Mac equivalents. Note that this menu does not replace the Start menu, so if you install WinMac, be sure to leave the Start menu on the bottom of the desktop; otherwise, the Start menu will obscure WinMac's menus.

### Make It Look Like a Mac

- **Make Windows 95 use the real Mac interface.** If you're running the Microsoft Plus Pack, there's an easy way to get that authentic Mac look rather than the pale version appropriated by Microsoft: install the Mac95 desktop theme. This shareware transforms your desktop icons, pointers, fonts, and sounds to Macintosh incarnations and installs a Mac-like folder called Control Panels in your Start menu. To run Mac95, you'll need to run either the Themes program from the \$50 Microsoft Plus add-on package or the \$15 shareware program Theme Plus.

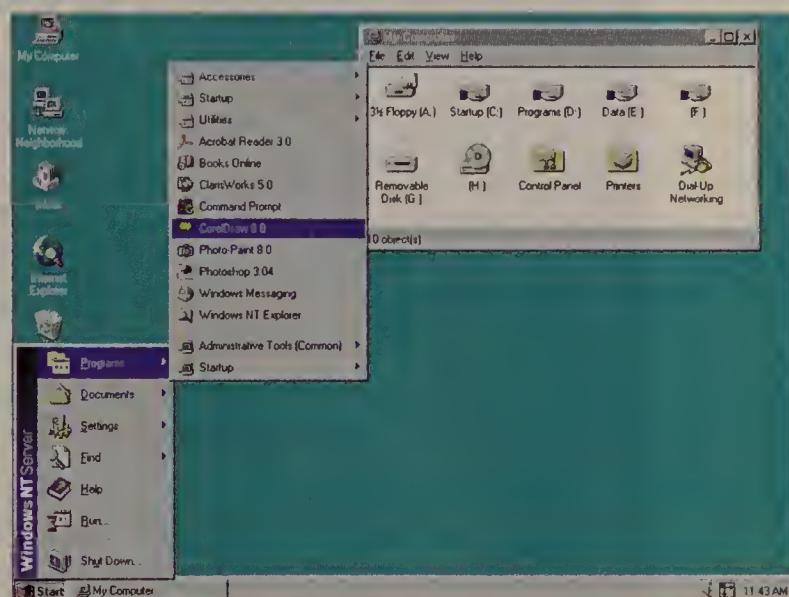
- **Make it Mac from the start.** Get a Mac start-up screen by installing the Mac95ivs shareware program. Note that this requires you to install the Microsoft TweakUI program (which you can download from [www.microsoft.com/windows95/info/powertoys.htm](http://www.microsoft.com/windows95/info/powertoys.htm)) and use it to disable the normal Windows splash screen. Also, this start-up screen was designed to work with 640-by-480-pixel displays and will look chunky on a higher-resolution monitor.

- **Satisfy your logo envy.** Replace the Windows logo in the Start menu with an Apple logo by installing the MacBar shareware program.

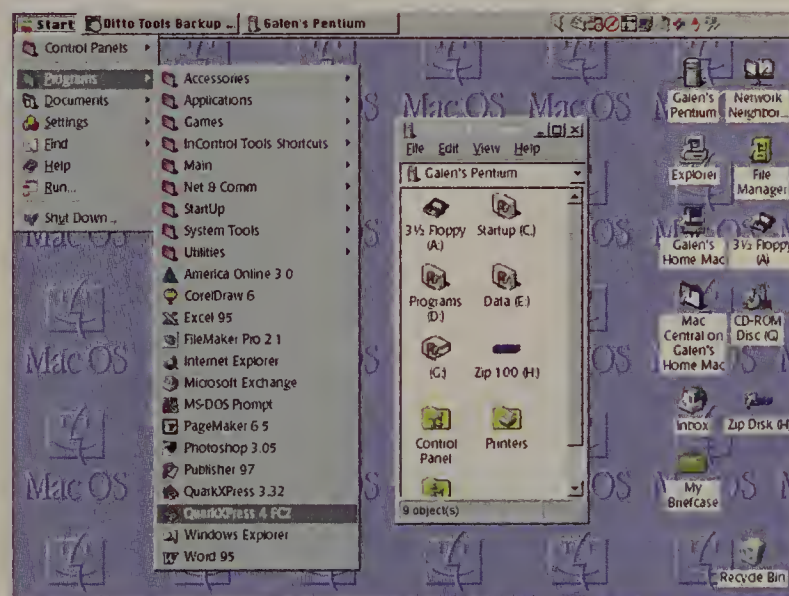
- **Get the Mac OS 8 look.** We think Mac95's System 7-style icons are not as attractive as Mac OS 8's, so we use the icons from John Beckett's Icon Pack 1 instead.

- **Use your favorite desktop patterns.** You can use any Mac desktop pattern on a PC. Simply drag the pattern from the Mac's Desktop Patterns control panel to the desktop, making a clipping file. Import that clipping file as a PICT Resource in Adobe Photoshop, and then save the imported file as a BMP file, Windows' native format. (Be sure to append the file extension .bmp so that Windows *knows* it's a BMP file.) Transfer that BMP file to the PC, putting the file in the main Windows directory with the other Windows desktop patterns. Then change desktop patterns in the Display control panel's Background tabbed pane. We've converted 24 Mac desktop patterns for you, which are available on the *Macworld* Web site along with several dozen Mac-like patterns. **m**

GALEN GRUMAN, *Macworld's* editor, has used Macs as well as PCs since they were introduced nearly 15 years ago. INGALL W. BULL III is a social worker and manages Macs and PCs for several high schools.



Before The original Windows 95/NT interface.



After Behold! The Windows interface revamped with the Mac look.



**A Different Look** Experiment with these tips to create a custom Mac look for your PC. For example, try the WinMac shareware program to add a real Apple menu.



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# Publishing Power Play

This Speedy NT  
System Was Made  
for Mac Pros  
Like You.  
Is the Switch  
Worth Making?

BY BRUCE FRASER

IT'S FAST, *REALLY* FAST. IT RUNS ADOBE PHOTOSHOP ABOUT 25 PERCENT QUICKER THAN Apple's top-of-the-line 266MHz Power Mac G3. It's targeted at the throngs of publishing professionals who rely on the Mac to get their jobs done. Sounds like a natural, right? There's just one catch: this computer is a 300MHz Pentium II-based PC that runs Microsoft Windows NT 4.0, not the Mac OS. Microsoft and PC vendors are making a power play for the publishing market, traditionally a Mac stronghold. Over the past few years, Windows NT has made significant inroads into the desktop-video and 3-D-graphics arenas. Now Microsoft is touting Windows NT as "the publishing platform" as well. Big PC companies are joining old-line workstation



The Intergraph  
ExtremeZ 2D  
Graphics  
Workstation is  
fast, but is it  
publishing-savvy?



companies to persuade Mac users to buy NT workstations. Even Mac licensee Unisys Computer will debut an NT PC.

I've been using Macs faithfully since February 1984, and most of that time I've been skeptical about Microsoft's understanding of my world—graphics and publishing. So has Microsoft changed? Is Windows NT 4 *really* a suitable platform for publishing professionals?

To find out, *Macworld* decided to try out the system that may be the best-case scenario for integrating Windows NT into a primarily Mac OS work environment: the new Intergraph ExtremeZ 2D Graphics Workstation. Sure, the ExtremeZ 2D is fast, but how challenging would it be to plop it—wanted or not—into a Mac-based studio?

### First Impressions

The only major difference between starting up the ExtremeZ 2D and starting up a Mac is that with an NT system, you have to log on. Windows NT comes with an account already defined—the user name is Administrator, and there's no password—you can log on immediately.

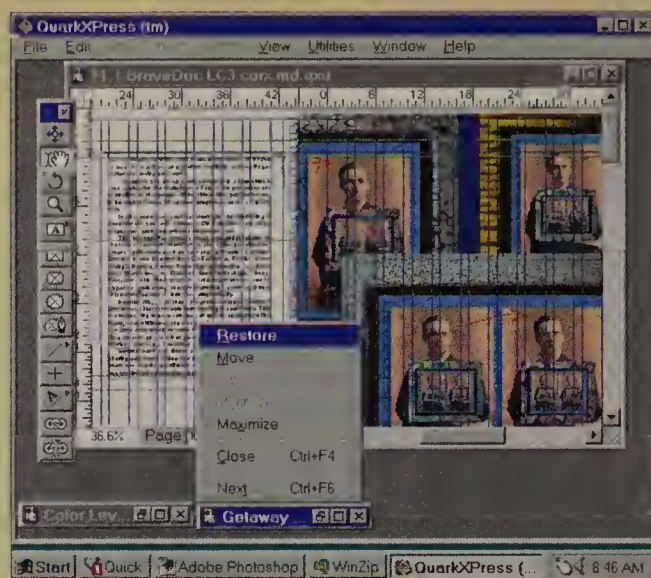
**Getting Started** After that, Intergraph's preinstalled software took care of the nitty-gritty. Miramar Systems' PC MacLAN software made connecting to my existing AppleTalk network about as simple as possible (for more on cross-platform tools, see the feature "Mac Life Preservers," elsewhere in this issue). I mounted all my shared Mac volumes on the NT system's desktop. And after enabling sharing in PC MacLAN, I

consistent interfaces. However, if you rely on plug-ins, you'll find the Windows selection pathetically small.

All in all, I was surprised at how easy it was to get started with Windows NT. But as I went about my work, there were still plenty of reminders that I wasn't using a Mac. Some of these issues were minor annoyances, but others were serious.

**User Interface** NT 4.0's user interface is different from that of the Mac OS in terms of its layout. However, it's somewhat customizable (see the feature "Windows Beauty Tips," elsewhere in this issue) and isn't difficult to learn well enough to get your work done.

The Windows Task Bar lets you open applications and documents, somewhat like the Mac's Apple menu, although each application's menus appear inside the



WINDOWS NT HAS A MAC-LIKE INTERFACE, BUT it's not a complete clone. Each application window has its own application menu, and any programs or files open are displayed in the Task Bar.

## You'll find counterparts to almost all mainstay Mac software—but plug-in support is weak

mounted the NT system's shared volumes on my Macs, too. Reading Mac floppies wasn't a problem, either, thanks to DataViz's MacOpener 3.0.

The Intergraph system also comes with your choice of several different software bundles preinstalled. Conveniently, the software that publishing pros use—QuarkXPress; Macromedia FreeHand; and Adobe PageMaker, Photoshop, and Illustrator—all have compatible Windows NT and Mac OS versions that read each other's files and have surprisingly

application window. The Task Bar contains icons for all currently running applications and for windows for local and networked volumes (see the screen shot "Different Windows").

You can "minimize" NT's windows—which is like using the Mac's Window-Shade feature. The Task Bar gives you a quick way to expand them again. It's not very Mac-like, but it's very convenient.

**Viewing Files** NT's options for viewing volumes, files, and folders are primitive compared with Mac OS 8's

Finder. I found myself missing things I take for granted on the Mac, such as being able to expand and contract multiple levels of folders within one window.

**Find** I also found NT's Find command surprisingly limited—no Boolean searches, and only limited searching for partial file names. You can't, for example, search for documents whose names *don't* end with .2—under NT, you can search only for names

that begin with, contain, or end with a specific string of characters and only by using DOS wild-card syntax. Typically this means you have to be much more organized both in how you name files and where you save them.

**File Names** Windows applications won't deal with Mac files unless you include the appropriate three-character extension at the end of the file name (.tif for TIFF files, for example) or change the settings in the programs' Open dialog box to display all files, using the All Files (\*.\*) option. Unless the file has a recognized extension, you can't double-click on it to open it from the desktop or from a folder. Note that Photoshop requires you to have .psd extensions on file names. Without this extension, you can't open Photoshop files under NT.

You may also have problems with long Windows NT file names (such as "really pretty red and blue boats somewhere in Connemara, Ireland") that the Mac, with its 31-character limit, can't display. (Windows NT can support file names up to 253 characters in length.) Reconciling file names across platforms is simply something you have to learn to deal with in a cross-platform environment. (See the feature "Save Your Mac!" elsewhere in this issue, for solutions.)

**File Translation** Another problem arises from the fact that the Mac OS and Windows use different encodings for the upper 128 ASCII characters. I found it mildly disconcerting that the name "Bruce's Macintosh" showed up in Windows as either "Bruce[213]s Macintosh"



# How Does the ExtremeZ 2D System Rate?

## THE INTERGRAPH EXTREMEZ 2D GRAPHICS

Workstation is clearly targeted at Mac users.

Its preinstalled AppleTalk connectivity and publishing-software bundles are all aimed at

making it as easy as possible to add a Win-

dows NT workstation to a network of Macs.

While Intergraph's attempts to make Windows NT Mac-friendly are admirable, let's be clear on the real source of the Intergraph system's appeal: it's *really* fast.

### Speed Thrills

The \$8,622 system we tested was powered by two 300MHz Pentium II CPUs; 256MB of RAM; and three 10,000-rpm 4GB Ultra Wide SCSI drives, two of which were striped to form an 8GB array. (The workstation can accept up to 512MB of RAM. To rig up a comparable Apple Mac is impossible today, as the G3 Macs top out at 384MB of RAM. Only Umax Computer's SuperMac S900 line has enough RAM slots and drive bays.) The \$4,995 base model has one 300MHz Pentium II, 64MB of RAM, and one 4.3GB hard drive.

Macworld Lab's results show how Intergraph's performance-oriented technology choices paid off: the ExtremeZ 2D significantly outpaced the Macs in most Photoshop tests. For QuarkXPress and MetaCreations' Infini-D,

though, the ExtremeZ 2D's speed advantage was smaller.

Speed doesn't come cheap. A comparably equipped Umax SuperMac S900Base with Maxpowr Pro+ 250 (510/226-6886, [www.supermac.com](http://www.supermac.com)) with an 8MB Seagate Cheetah, like the one we tested, costs about \$6,900. A similarly equipped Apple Power Mac G3 266 tower (408/996-1010, [www.apple.com](http://www.apple.com)), costs about \$6,300.

The ExtremeZ 2D isn't a clear bargain compared with high-end Macs. And the price of the ExtremeZ 2D doesn't include Windows versions of your applications and fonts.

### Friendly Start-Up

Intergraph has done a splendid job of making its system easy for Mac users to set up, by preinstalling cross-platform connectivity software. Operations such as configuring the Windows swap file (NT's equivalent of virtual memory), setting up Photoshop's memory allocation, and configuring network services can be a real challenge, so it's nice that Intergraph has done that work for you.

Intergraph also offers several software bundles aimed at different graphics and publishing tastes. We tested the \$1,095 Designer bundle, which includes preinstalled versions of Adobe Photoshop 4 and Meta-

### ExtremeZ 2D Graphics Workstation ★★★½

**PROS:** Speedy, highly expandable, good bundled Mac connectivity.

**CONS:** Requires purchase of Windows programs and fonts.

**COMPANY:** Intergraph Computer Systems (205/730-5441, [www.intergraph.com/ics/](http://www.intergraph.com/ics/)).

**COMPANY'S ESTIMATED PRICE:** \$8,622.

### Apple Power Macintosh G3 266 Tower ★★★

### Umax SuperMac S900Base with Maxpowr Pro+ 250 ★★★★

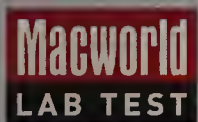
For details on these Mac systems, see "PowerPC 750 Systems," *Reviews*, March 1998.

Creations' Painter 5 and Kai's Power Tools 3. The Designer bundle also includes a limited color-management application that only lets you view the effects of different profiles. The \$2,195 Pro bundle comes with Color Solutions' fuller ColorBlind package.

### Macworld's Buying Advice

Intergraph has done a great job of delivering a Windows NT workstation that a Mac user can become productive with quickly. If someone held a gun to my head and forced me to buy a Windows system, I'd want to find a computer like this one: a system that's really plug-and-play and arrives preconfigured.

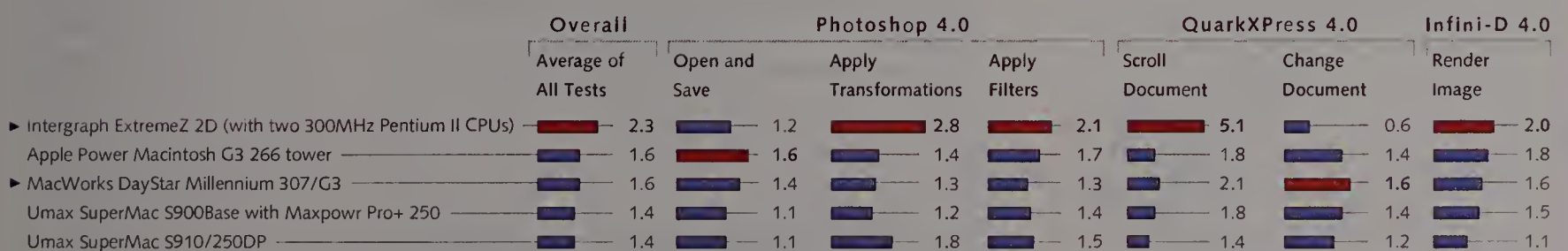
But despite Intergraph's yeoman efforts, the increase in speed isn't enough to compensate for Windows NT's publishing shortcomings. I'd still get a Mac.



## Intergraph Takes on the Mac

There's no question: A fully loaded NT workstation outpaces fully loaded Macs in most publishing-oriented operations. You pay a higher price but get more performance. However, once you factor in the cost of software and the knowledge needed to take advantage of NT, as well as NT's limitations in some key areas, the speed's cost becomes more than just dollars.

■ Best overall performance. Longer bars are better. Bold indicates best result in a specific test. ▶ New system. An Apple Power Macintosh 7300/200 has a score of 1.0.



### Behind Our Tests

Macworld Lab tested several operations in Adobe Photoshop 4.0, QuarkXPress 4.0, and Infini-D 4.0 to compare performance differences between Macs and PCs. The Macs had 256MB of RAM and 8MB of VRAM, and ran Mac OS 8.1. The Intergraph NT system had 256MB of RAM and 8MB of VRAM, and ran Windows NT Workstation 4.0. —Macworld Lab testing supervised by Susan Silvius



or "Bruce's Macintosh," depending on how I transferred it.

QuarkXPress and PageMaker translate some of these oddities automatically so that characters such as smart quotes are correctly handled, but occasionally the translation breaks down. For example, Windows has no ligature characters. At minimum, you need to proof type carefully whenever you send it between the

long time, it's the myth that Windows NT is far less crash-prone than the Mac OS. PC users know better, and so should you.

The truth is that NT does indeed crash. In the time I spent working with the Intergraph workstation, it crashed three times—and I mean the entire OS, not just the foreground application.

During this same period, my Power Mac 8100 crashed twice—Netscape Nav-

fonts on both platforms, you'll likely still run into problems translating special characters that aren't supported by Windows, such as the *fi* and *fl* ligatures.

**Keeping Color in Sync** Color management has gone from being the butt of many jokes to a vital component in publishing enterprises. On the Mac, I can display and edit accurate, reliable soft proofs in Photoshop, QuarkXPress, PageMaker, and any other ColorSync-aware application. With Windows NT, I can't even get CMYK files to look the same in Photoshop and QuarkXPress. There's no way to calibrate the monitor at the system level; on the Mac, there's one system-level video driver that all applications use, so Mac monitor calibration works across all applications. Photoshop presents a particular problem, because the Windows version uses a proprietary calibration routine that can't be turned off.

All this may change when Windows NT 5.0 hits later this year or early next year. But the plethora of legacy video cards and video drivers will continue to plague the Windows world long after the release of NT 5.0.

## The Last Word

My introduction to NT was much less painful than I had feared, and even the most die-hard Mac bigot would have to concede that Intergraph has done a creditable job of integrating a Windows NT system into a Mac environment.

But even after using a Windows NT system designed especially for Mac users like me, I'm not quite ready to jump ship. Windows NT still feels like a work in progress: things are generally either reasonably easy to master or turn out to be impossible. You always have the impression that there's a behemoth lurking below the surface, ready to swallow you whole if you make even one misstep. For now, at least, I'll continue to plug away on my Macs—while keeping an eye on the competition. **m**

Contributing editor BRUCE FRASER is coauthor of *Real World Photoshop 4.0* (Peachpit Press, 1997).

## People say NT is not crash-prone. PC users know better than that, and so should you.

two platforms, and you'll need to spend time correcting translation errors.

**Drivers** Printing was a little trickier under Windows, because each printer needs a driver. The installer wizard made installing the driver for an Apple LaserWriter very easy. For my NewGen Chromax dye-sublimation printer, I had to search further afield, but I managed to download the installer to a Mac from NewGen's Web site, transfer it to the ExtremeZ 2D, and run it to install the driver. Two hours after unpacking the machine, I'd made my first dye-sub print from a Windows system—so far, so good.

**Scanners** Finding the appropriate cable, downloading the appropriate drivers, and running the installer worked seamlessly in the case of a Hewlett-Packard ScanJet 3c scanner. Bear in mind, though, that not all scanners have Windows NT drivers, so you may not be able to attach an existing scanner as easily as I did. In a worst-case scenario, this could mean you'd have to buy a new scanner just for your new NT-based PC.


**Colorimeters and More** Serial devices required an adapter to go from the mini-DIN 8 plugs used by the Mac to the DB-9 plugs used on Windows PCs. However, serial devices—such as spectrophotometers, colorimeters, and other prepress must-haves—that also draw power from the ADB bus on the Mac require an external power supply for use with Windows. ADB devices are, of course, incompatible with Windows PCs. And even for serial devices, you may need driver or other configuration files.

**Stability Issues** If there's anything that users of Windows NT have hung over the heads of Mac users for a

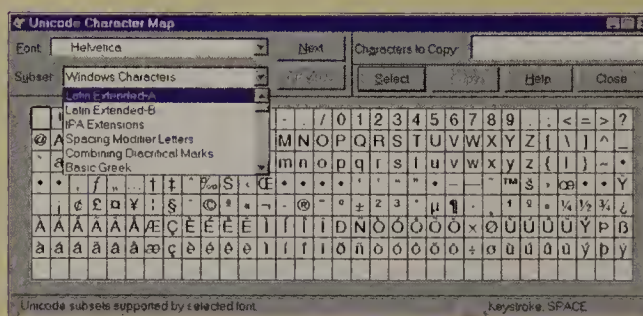
igitor, not surprisingly, being the culprit—and my other three Macs, a DayStar Genesis MP 800+, a Power Mac 7100, and my venerable IIfx, didn't crash at all. This is a purely subjective observation, but I saw no evidence that Windows NT is much more stable than the Mac OS.

## Publishing Problems

The problems I encountered that were due to my inexperience would be overcome quickly, although similar issues will eat up some time and money at any Mac shop adding NT. But there are some grave publishing-specific problems that even a best-case-scenario machine such as the ExtremeZ 2D can't overcome on its own.

**Fonts** While Fontographer 4.1 (\$495; ) from Macromedia (415/252-2000, [www.macromedia.com](http://www.macromedia.com)), will convert Mac fonts to PC fonts and vice versa, something often gets lost in the translation. It's probably less painful and time-consuming to buy Windows versions of your fonts. If you own an extensive library, this could easily cost thousands of dollars. Even with the same

## Font Variations



WINDOWS OFFERS DIFFERENT EXTENDED CHARACTERS than the Mac does (see the bottom row of this Key Caps-like utility that comes with Windows), and NT supports fonts that use the multilingual Unicode standard. But NT does not support ligatures.



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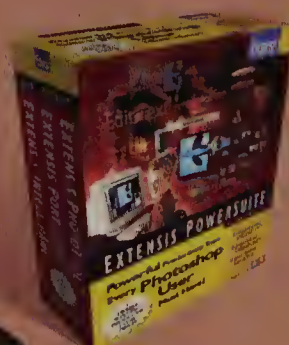
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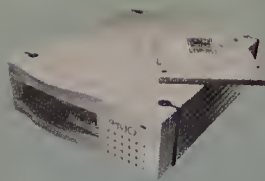
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MACWORLD LAB  
CUTS THROUGH  
THE CONFUSION TO  
FIND THE BEST  
56K MODEMS

# The Modem Showdown



YOU DON'T WANT TO KNOW WHAT makes your modem tick. You care about Web surfing and e-mail, not the gory details of how your data gets from point A to point B.

But if you want to really speed up your connection to the Net by buying one of the new generation of high-speed 56-Kbps modems, you *have* to care, at least a little. If you don't, you could end up with a modem that's half as fast as you want it to be.

That's because choosing and using a modem have become more complicated than ever before, thanks to a feud between rival 56K-modem manufacturers and to the technological trickery the modem makers have used to push modem speeds higher and higher.

Macworld Lab ferreted out the truth behind 56K-modem vendors' hyperbolic performance claims, testing competing modems from each of the two warring camps—x2 and K56flex—14 in all, including both external and PC Card models. We discovered a few secrets that'll help you get the most out of your modem investment.

BY RIK MYSLEWSKI



## 56K Misconceptions

When we lump all these new, fast modems into the 56K category, shopping for one sounds like a simple exercise. But in truth, calling a modem 56K can create more confusion than it solves.

**Incompatibility Problems** Not all 56K modems are alike—for the moment, each 56K modem supports one of two protocols, each of which is completely incompatible with the other: *x2* and *K56flex*. And despite those promising names, don't believe that these modems will reliably speed your data along twice as fast as a now-out-of-date 28.8-Kbps modem. They won't.

**Not Really 56K** The figure 56 Kbps—designating the ability to transfer roughly 56K of data per second—is a theoretical top speed that's fiendishly difficult to achieve in the real world. What's more,

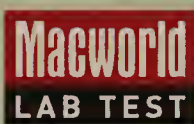
current FCC regulations limit even the theoretical top speed of *x2* modems in the United States to just 53 Kbps. (K56flex modems can theoretically achieve 56K speeds on U.S. lines.) The top-performing modem in our tests could muster an average speed of only 51.3 Kbps during a series of FTP downloads.

**Download Only** If you're expecting to be able to upload files to your Web server at top speed by using a new 56K modem, be prepared for more disappointment. The 56K modems can achieve high speeds only when you're *downloading* files, e-mail, or Web pages. When you're uploading, your 56K modem falls back to the old-style 28.8-Kbps or 33.6-Kbps maximum data rates. (For a look at high-speed alternatives to 56K modem technology, see the sidebar, "Toss That Modem: Alternatives to 56K.")

## Inside Your Modem

As its name says, a modem *modulates*, or converts, a digital signal from your Macintosh into an analog signal so it can be sent over a phone system built to carry voices instead of data. When this signal reaches its destination, another modem *demodulates*, or converts, it back into digital information.

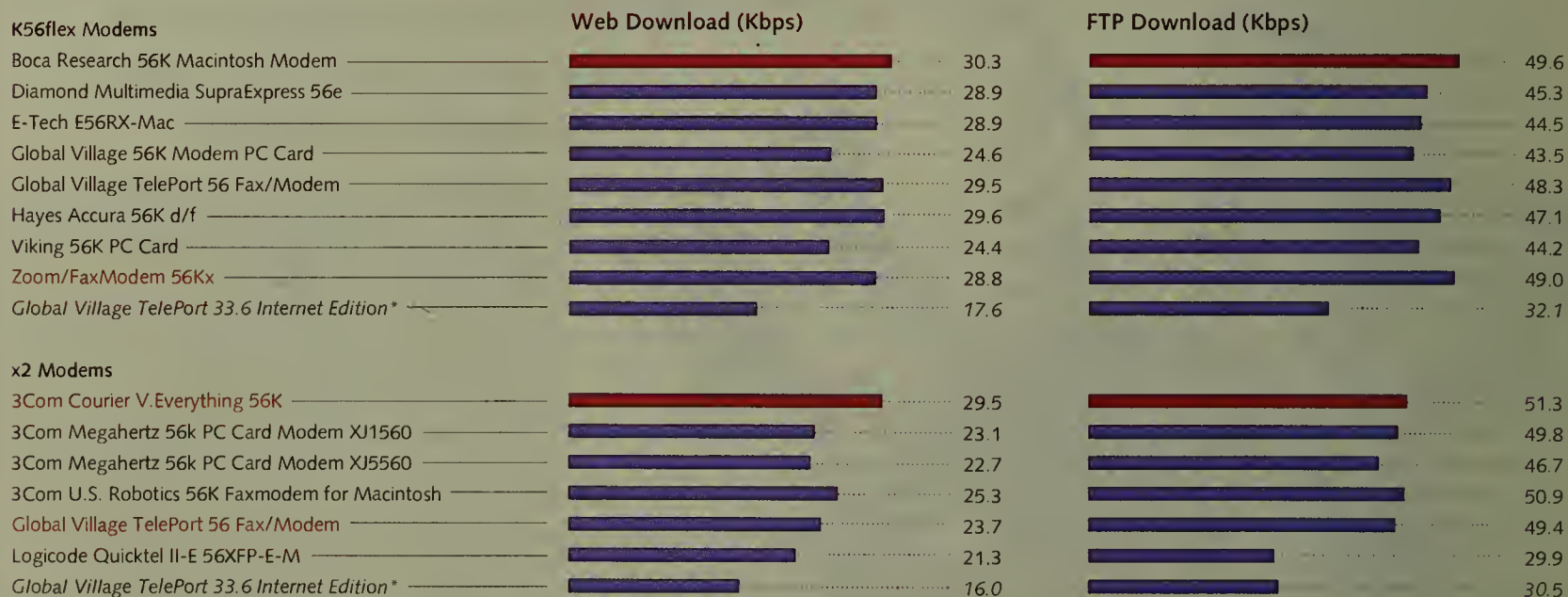
**The Big Bottleneck** That sounds simple enough—and it was, back in the old days when all phone lines were analog. But in the past few decades, the core of the telephone network has gone digital. Nowadays, when you place a call, it gets converted into a digital signal at your phone company's central office in your neighborhood and is routed over high-speed digital lines to a central office near your call's destination. That conversion from analog to digital introduces some



## The Great Modem Race

While none of the modems we tested came anywhere near the 56-Kbps speeds their names would suggest, they did (with the exception of the Logicode Quicktel II-E 56XFP-E-M) offer a big speed improvement over their 33.6-Kbps predecessors. The 3Com Courier V.Everything 56K was the top scorer in our FTP download, the equivalent of a modem drag race. The Boca Research 56K Macintosh Modem was tops in the multifile Web download, a test in which both speed and agility were factors.

Best result in test. Longer bars are better. Editors' Choice winners' names are in red.



\*33.6-Kbps modems tested for comparison.

## Behind Our Tests

All the modems we tested dialed in to a Windows NT 4.0 remote-access server running Microsoft's Internet Information Server 3.0. The K56flex modems dialed in to a Rockwell I-WCEM server modem; the x2 modems dialed in to a 3Com Courier I-modem. Our client machines were a Power Mac 7300/200 (for the external modems) and a PowerBook 3400c (for the PC Cards), both running Mac OS 8.0 and connecting via Apple's Open Transport PPP. For our Web download test, we used Netscape Navigator 3.0 to

download a frame set containing 32 different HTML, GIF, and JPEG elements totaling 680K. For our FTP download test, we used Fetch 3.0.3 to download a 2.4MB StuffIt archive containing a QuarkXPress document. We gave each modem 20 chances (10 for each test) to connect to our server and transfer the files. The final data above are performance averages for each test and therefore do not represent consistent, repeatable data-transmission rates.

—Macworld Lab testing supervised by Kevin Mitchell



noise into the connection. And that noise limits the speeds your modem can achieve.

The 56K modems bypass that bottleneck. Since most Internet service providers (ISPs) and remote-access servers are connected to high-speed digital phone lines, they just digitally encode data and pump it directly into the digital phone network, eliminating the noise-inducing analog-to-digital conversion.

**One-Way 56K** In the opposite direction, things aren't as rosy. Your data still has to undergo a noise-inducing analog-to-digital conversion, which limits your upload speeds to 28.8 or 33.6 Kbps, as it hops into the digital core of the phone system.

But really, is that so bad? If you're surfing the Web or downloading files from your corporate server, you need speed downstream, not up: you're sending compact commands and receiving bloated Web pages, JPEGs, or corporate databases.

If you spend a lot of time sending data—whether you're running a Web server or are uploading lots of files on a regular basis—you may want to consider sticking with a 28.8 or 33.6 modem.

### When 56K Isn't 56K

So now we're all ready to crank up our modems and start downloading 56K's worth of data every second, right? Hold your horses.

**Modem Mayhem** The biggest problem with 56K modems has always been that x2 and K56flex modems simply don't work with one another, at least at 56K speeds. In other words, an x2-equipped client can't access a K56flex-equipped server at 56 Kbps, and vice versa. (They can still communicate with one another at the old-fashioned speeds of 28.8 or 33.6 Kbps, however.)

Because the performance of the two competing standards is essentially equal, the main reason to choose one over the other is compatibility with your ISP's modem. Although many ISPs claim to support both x2 and K56flex, be sure to ask yours how many ports it has dedicated to each type of access, to see if it favors one standard over the other.

Understandably, ISPs have been wary about which standard will become the dominant one, so many have been dragging their feet, waiting for a clear winner to emerge before they make a substantial investment in 56K technology.

Fortunately, that wait is about to end. In December 1997, the two sides stopped

## TOSS THAT MODEM: ALTERNATIVES TO 56K

Our hurry-up culture has invented instant coffee, Instant Breakfast, and instant replay. So when can we expect to get instant Internet access?

Sorry, it'll take a few more years—but it will happen. Cable modems, for example, promise data rates in the 10-Mbps

will push for a unified xDSL standard may speed up that process, however.)

So are you limited to 56K performance until cable-modem or xDSL service is made available in your area? Thankfully, no. If you really need speed, there are alternatives available—for a price.

may at last be living up to its overhyped reputation. Most important is the fact that ISDN service is finally being offered at affordable prices in a wide variety of locations.

What's more, ISDN's notorious setup complexities are being overcome by such companies as Big Island Communications (650/237-0350, [www.big-island.com](http://www.big-island.com)), with its 128-Kbps Boogie Board (\$199), and Netopia (510/814-5000, [www.netopia.com](http://www.netopia.com)), with its eponymous series of cool-looking ISDN routers.

**Frame Relay** If ISDN is still too slow, frame-relay technology may be the way to go. The beauty of frame relay is that you don't have to lease an entire high-speed line all by yourself; instead, a frame-relay provider books you space on its line, which you share with other subscribers. Most providers offer a variety of different service levels, from a mere 56 Kbps to a hot 1.53 Mbps.

Although frame relay isn't inexpensive—prices vary widely, depending upon location and bandwidth requirements—hardware needs are modest: a frame-relay-capable hub, and a router if you're switching protocols. Be warned, however: frame-relay service has become so popular that some service providers have overbooked their lines. And that means you may not always get the bandwidth you've paid for.



Using a Netopia ISDN router is just one of several faster-than-56K solutions that you can avail yourself of.

range—that's 200 times faster than even the best 56K modems.

Another promising technology is xDSL, a family of telecommunication schemes that uses existing phone lines to blast data from your ISP to your Mac at up to 6 Mbps.

But don't hold your breath: few cable companies have the infrastructure necessary to deploy cable modems, and few phone companies have committed to the investment required to provide widespread xDSL service. Although numerous field trials are under way, widespread deployment of either strategy seems unlikely until the next millennium. (Microsoft and Intel's recent announcement that the companies

**Dual-Line** One of the more ingenious solutions to the World Wide Wait binds two phone connections into a single data stream. If, for example, you connect your Mac to two 56K modems, each accessing your ISP over a separate phone line, you can theoretically achieve a 112-Kbps transfer rate.

Diamond Multimedia's dual-line modem technology, called Shotgun, will be added to all of its Supra-Express 56K modems later in the year. Expect other modem manufacturers to also offer dual-line technology later this year.

**ISDN** ISDN technology has been "promising" for so long that it's become an industry embarrassment. But there are encouraging signs that it



## Shoot-out at the 56K Corral

Company	Product	Mouse Rating	List Price	Phone	Modem Type	56K Standard	Mac-Compatible Cable Included
3Com	<b>EDITORS' CHOICE</b> 3Com Courier V.Everything 56K	★★★★½	\$250	408/764-5000	external	x2	●
	Megahertz 56k PC Card Modem XJ1560	★★½	\$269	408/764-5000	PC Card	x2	NA
	Megahertz 56k PC Card Modem XJ5560	★★	\$289	408/764-5000	PC Card	x2	NA
	U.S. Robotics 56K Faxmodem for Macintosh	★★★	\$199	847/676-7010	external	x2	●
Boca Research	56K Macintosh Modem	★★★★	\$149	561/997-6227	external	K56flex	●
Diamond Multimedia	SupraExpress 56e	★★★★½	\$139	360/604-1400	external	K56flex	● (attached)
E-Tech	E56RX-Mac	★★½	\$149	510/438-6700	external	K56flex	D8-9 w/DIN-8 adapter
Global Village	56K Modem PC Card	★★★	\$269	408/523-1000	PC Card	K56flex	NA
Communication	TelePort 56 Fax/Modem (K56flex)	★★★★½	\$169	408/523-1000	external	K56flex	● (attached)
	<b>EDITORS' CHOICE</b> TelePort 56 Fax/Modem (x2)	★★★★	\$169	408/523-1000	external	x2	● (attached)
Hayes	Accura 56K d/f	★★½	\$189	770/441-1617	external	K56flex	●
Logicode	Quicktel II-E 56XFP-E-M	★	\$219	800/735-6442	external	x2	●
Viking Components	Viking 56K PC Card	★★★	\$139	714/643-7255	PC Card	K56flex	NA
Zoom Telephonics	<b>EDITORS' CHOICE</b> Zoom/FaxModem 56Kx	★★★★½	\$139	617/423-1072	external	K56flex	●

● = yes; ○ = no; NA = not applicable.

their bickering and announced an agreement that will lead to the adoption of a unified standard, V.PCM. An interim standard should be released by the time you read this, with formal ratification to follow in September.

**Making the Upgrade** The adoption of a unified standard is a necessary step toward the universal adoption of 56K technology, but the transition won't be seamless. The good news is that all the 56K modems we tested are equipped with flash ROM, making them easily upgradable to the new V.PCM standard—theoretically.

However, when we tried to upgrade some x2 modems to the latest version of the x2 modem firmware, we found it impossible to use 3Com's Web-based upgrade wizard to actually update any of our x2 modems. 3Com says it's working to fix the problem, but any prospective modem buyer should be wary, since the transition from x2 and K56flex to V.PCM could be even rougher than our attempted transition from x2 to an updated version of x2.

To their credit, every modem vendor with which we spoke promised to offer free downloadable upgrades to the V.PCM standard. In addition, Zoom Telephonics ([www.zoomtel.com](http://www.zoomtel.com)) and Logicode ([www.logicode.com](http://www.logicode.com)) will offer the upgrade on disk, Global Village Communication ([www.globalvillage.com](http://www.globalvillage.com)) promises to also put it on its AOL site, and Viking ([www.vikingcomponents.com](http://www.vikingcomponents.com)) will even provide

a brand-new V.PCM-compatible modem if you return your old K56flex Viking 56K PC Card.

The real problem is timing. If you upgrade your modem to V.PCM, there's no guarantee that your ISP will do the same—and there's no guarantee that an ISP's upgraded server modems will be able to accept calls from x2 and K56flex modems.



The Global Village TelePort 56 Fax/Modem (x2, top) and the Zoom/FaxModem 56Kx are our Editors' Choices in the x2 and K56flex categories, respectively.

### Buying Today

Sure, there are possible pitfalls ahead, but there's still a lot to be said for buying a 56K modem today. Despite the caveats, it's hard to argue with the credo "Speed is good."

But do recognize that 56K modems are notoriously finicky. Our tests showed the performance of many to be wildly variable from test to test (see the benchmark, "The Great Modem Race").

The \$149 E-Tech ([www.e-tech.com](http://www.e-tech.com)) E56RX-Mac, for example, would poke along at under 30 Kbps when we first began testing and then speed up to a full 50 Kbps after it warmed up. The \$139 Diamond Multimedia ([www.diamondmm.com](http://www.diamondmm.com)) SupraExpress 56e had exactly the opposite problem: it cranked along at over 51 Kbps when it first started up and then sank to below 35 Kbps after it warmed up. Even worse, the SupraExpress 56e dropped the connection more than twice as often as any other modem we tested.

**Cool Runnings** By far the most reliable—and the most expensive—of the external modems is the \$250 3Com ([www.3com.com](http://www.3com.com)) Courier V.Everything 56K. If you need a modem for your business, this



Open Transport 1.2 CCL Included	Warranty (in years)
●	5
●	5
●	5
●	5
●	5
○	5
●	5
●	5
●	5
○	5
○	lifetime
○	5
●	7

is the one—and if your ISP doesn't support x2, change ISPs. One of the secrets of the Courier's success is that it runs cool; the digital signal processors in modems are very sensitive to temperature, a fact proved by the toasty and highly variable \$189 Hayes (www.hayes.com) Accura 56K d/f.

Heat was also the bane of all the PC Cards: they did poorly before they warmed up, and then they did poorly after they got too warm. If you plan to do serious surfing from your PowerBook, either stick with your current PC Card or buy a compact external model.

Our testers agreed that the \$169 Global Village TelePort 56 Fax/Modems were by far the most user-friendly and Mac-savvy of all. Their fax software is justly famous for its ease of use—although the competition's is getting better—and the modem-status information it provides in your Mac's menu bar is a useful aid in monitoring performance and diagnosing problems.

**Mac-Friendly Modems** Unless you are modem-savvy, you'll want a modem produced by folks who understand—and support—the Mac and its unique needs. One good way of determining whether a vendor is really committed to the Mac market is to see if it includes Open Transport CCL scripts, used by Apple's Open Transport PPP dialer (see the table, "Shoot-out at the 56K Corral").

Not only does Zoom have a long-standing dedication to the Mac but its

\$139 Zoom/FaxModem 56Kx was able to achieve the second-fastest throughput in our K56flex testing, with one file download topping out at a blazing 55 Kbps. The only K56flex modem that was faster was the \$149 Boca Research (www.bocaresearch.com) 56K Macintosh Modem, which turned in two astonishing runs: one at 55.5 Kbps and one at 55.3 Kbps.

Unfortunately, although the Boca has *Macintosh* in its name and includes a copy of Smith Micro's MacCommCenter fax and communications software, it lacks an Open Transport CCL script—not in the box, not even on the Web site.

**Speed Champs** Although the 3Com Courier V.Everything 56K consistently turned in the fastest times among x2 modems and the Boca Research 56K Macintosh Modem was the K56flex champ, all the modems but one turned in better-than-acceptable performances.

The lone disappointment was the \$219 Logicode Quicktel II-E 56XFP-E-M. This futuristic-looking unit consistently turned in times comparable to those of a V.34 modem, and its file-download scores were particularly dismal. Logicode's tech-support staff was unable to help.

### Macworld's Buying Advice

Today, the best way to decide between x2 and K56flex technology is to ask your ISP how many access ports it has for each and then to buy a modem based on the best-supported standard. If you're a home surfer with an x2-centric ISP, we recommend the x2 version of the elegant Global Village TelePort 56 Fax/Modem. If your ISP prefers K56flex, go with the Zoom/FaxModem 56Kx; its Faxstf software may not be as nifty as Global Village's GlobalFax, but it absolutely screams—and it has enough status LEDs to keep you amused for hours.

If, on the other hand, you're a business type whose success depends on steady, reliable connections to your ISP or remote-access server, pony up the extra hundred bucks for an x2 3Com Courier V.Everything 56K. It's built like a tank, it can handle anything you throw at it, and it'll last forever. The Courier's so good that it's worth changing to an x2-equipped ISP.

If you have a PowerBook and are looking for a PC Card modem, the results are murkier. The PC Cards we tested weren't particularly impressive; if you're a hard-core PowerBook modem user, you

should consider buying an external modem or sticking with your current modem until the transition to the V.PCM standard is complete.

Of course, how well all the modems we tested will perform when upgraded to the new V.PCM standard is a question for the future—and the future's not here yet. For now, the best advice we can give is: Stay tuned. **m**

RIK MYSLEWSKI is managing partner of Smart-people, a technology-testing and -marketing group. He's been around long enough to have used 300-baud modems and acoustic couplers.

## EDITORS' CHOICE

### x2 Modem

★★★★ Global Village TelePort 56 Fax/Modem This reasonably speedy modem is easy to set up and use, has great software, and was designed with the Mac in mind. **Company:** Global Village Communication (408/523-1000, www.globalvillage.com). **List price:** \$169.

### K56flex Modem

★★★★½ Zoom/FaxModem 56Kx Although the K56flex version of the Global Village TelePort 56 Fax/Modem is as good a buy as the x2 model, the fast, affordable, and feature-rich Zoom/FaxModem 56Kx is just a notch better. **Company:** Zoom Telephonics (617/423-1072, www.zoomtel.com). **List price:** \$139.

### Business Modem

★★★★½ 3Com Courier V. Everything 56K If your business depends on fast, reliable Internet or remote-access-server connections, find an x2-equipped Internet service provider and buy a 3Com Courier V.Everything 56K. It's definitely worth the price. **Company:** 3Com (408/764-5000, www.3com.com). **List price:** \$250.

### PC Card Modem

Due to their disappointing performance, we can't recommend any PC Card modems. Stick with your 28.8 or 33.6 model, pack along a compact external 56K modem, or wait until the V.PCM standard is finalized.

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# Secrets

## The HFS+ Survival Guide

HOW TO GAIN INSTANT, FREE HARD-DISK SPACE WITH MAC OS 8.1

by Joseph Schorr

**H**ow would you like to expand your hard-disk storage capacity by hundreds of megabytes—without using a compression utility, installing a single system extension, or spending a dime?

You may be able to do just that if you're using Mac OS 8.1, which supports Apple's new Mac OS Extended Format, or HFS+. This new disk format replaces the aging Hierarchical File System (HFS), which Apple now refers to as Mac OS Standard Format. HFS+ greatly optimizes the storage capacity of your hard disks by making more-efficient use of hard-disk space (see "How HFS+ Saves Space").

This sounds too good to be true, but it really works. Reformat your current hard disk as an Extended Format disk, and when you're done, you'll find you've reclaimed an enormous amount of storage; all your files simply take up less disk space. Just how much space you reclaim in this process depends partly on the size of your disk—the larger the disk, the more space you stand to gain. You'll also reclaim more space if you have a large number of small files, rather than just a few enormous files.

HFS+ is one of the most meaningful improvements Apple has brought to the Mac in years. But don't rush out and start reinitializing your disks just yet. If you're not careful, you can end



up with plenty of hard-disk space but no way to access your files. Here are some pointers for upgrading to HFS+, and a few important warnings.

### The Rules of HFS+

- The larger your hard disk, the more you can benefit from HFS+. On disks smaller than 1GB, the space-saving benefits aren't nearly as dramatic. For instance, you can format an 80MB disk with HFS+, but you won't gain even a megabyte; with a 1GB disk, you'll

probably gain well over 100 megs.

- You can't use an HFS+-formatted disk as the start-up disk in any 680X0 Mac. Only PowerPC-based Macs can start up from an HFS+ disk.

- Hard disks formatted with HFS+ can't be selected as virtual-memory disks (in the Memory control panel).

- You can't format floppy disks as HFS+ volumes.

- You can access HFS+ disks only from Macs running Mac OS 8.1. If you

*continues*



## How HFS+ Saves Space

UNDER THE CREAKY OLD HIERARCHICAL FILE SYSTEM (HFS), INTRODUCED 12 years ago, every disk—floppy disk, hard disk, Jaz cartridge, whatever—is divided up into 65,536 equal-size blocks. These allocation blocks serve as the tiny “parking spaces” where the Mac stores individual chunks of data.

In the old days, when a 20MB hard disk seemed insanely huge, the 65,536 blocks mapped out onto each disk were indeed tiny. But as disks have grown, so have block sizes. When you divide 500MB into 65,536 blocks, the block size turns out to be 8K. On a 4GB disk, however, each block is 64K.

The result is a colossal waste of space. That's because even the smallest file on any disk has to occupy at least one block, the smallest disk storage unit that the Mac can understand. So a file containing 2K of data will use up an entire 64K (one block) on a 4GB disk, wasting nearly 97 percent of the storage capacity within that block. Likewise, a 70K file on the same disk will swallow up 128K, because the file requires at least two 64K blocks to contain it.

Under the new Mac OS Extended Format, HFS+, the maximum number of blocks allowed on a disk swells from 65,536 to 4.29 billion. That means that even huge disks can be formatted with much-smaller blocks—and smaller blocks mean less wasted space. For instance, on a 4GB disk formatted with HFS+, a file containing 4K of data will occupy no more than 4K of space.

try to mount an HFS+ disk on a Mac running an earlier system, all you'll see is one file: a Read Me document called `Where_have_all_my_files_gone?`, which explains how to upgrade to Mac OS 8.1. Macs running earlier system versions *can* access files on HFS+ disks over a network, however, as long as the server is running OS 8.1.

- You'll need to upgrade your current hard-disk tools and utilities; most of them won't work properly with HFS+—formatted disks. Keep an eye out for new versions of programs such as Symantec's Norton Utilities and MicroMat's TechTool, which are being updated to deal with problems on HFS+ volumes. FWB also plans to release an HFS+—compatible version of Hard Disk Toolkit.

### Making the Switch

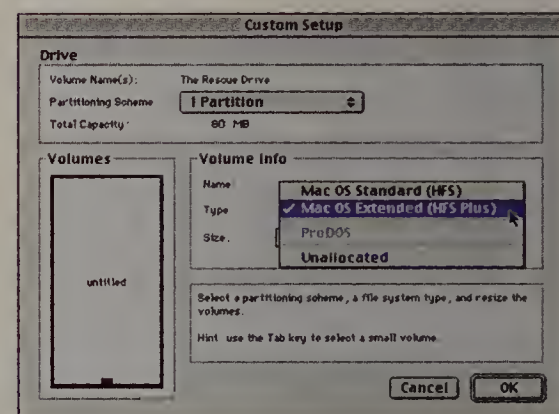
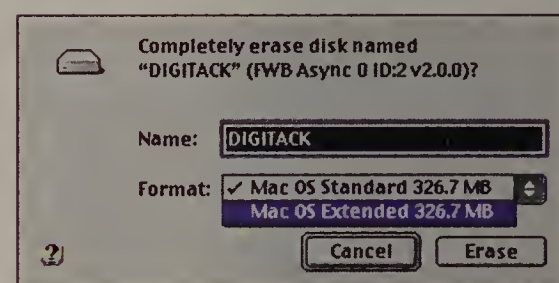
Converting a disk to HFS+ means completely reinitializing it, which involves erasing all the data on it. So the first step in the conversion process is to create a reliable backup of your entire hard disk. When you're done reinitializing your hard disk, you'll have to copy all your files back.

To reinitialize the disk, select it in the Finder and choose the Erase Disk command (obviously, the disk you're reinitializing can't be your current start-up disk). In the Erase Disk window, choose Mac OS Extended from the Format pop-up menu. Alternatively, you can use Apple's Drive Setup utility (version 1.4 or later), which gives you more options than the Erase Disk command does. First click on Initialize, then click on Custom Setup and choose Mac OS Extended (HFS+) from the Type pop-up menu (see “Extend Yourself”).

There's also at least one way to convert to Extended format *without* reinitializing your hard disk: use PlusMaker, by AlSoft (281-353-4090, [www.alsoftinc.com](http://www.alsoftinc.com)), a \$19.95 utility that converts your existing HFS disks into Extended-format volumes without reformatting them, leaving your data intact. PlusMaker can create allocation blocks as small as 0.5K in size—the smallest possible under HFS+—and converts disks faster than Drive Setup can. Because it doesn't reformat your disk, you don't need to recopy your files after you use it. It's still a good idea to backup your data first, though.

### Best of Both Worlds

Remember, if you reformat a removable or an external hard disk with HFS+, your files will be inaccessible from any Mac running a system earlier than version 8.1. But there is a way to make sure you never find yourself unable to access your files when you connect your drive to another Mac: When setting up your HFS+ disk with Drive Setup, create *two* partitions—one large Extended Format (HFS+) partition for all your data, and one tiny Standard Format (HFS) partition. Then install a Mac OS 8.1 System Folder on the small HFS partition. To waste as little space as possible, use the System Folder from the



**Extend Yourself** To format a disk with HFS+, choose Mac OS Extended when using the Erase Disk command (top) or when using Apple's Drive Setup utility (bottom).

Mac OS 8.1 Disk Tools package, which includes a scaled-down version of OS 8.1 that fits on a single floppy disk. (You have to create the two 8.1 Disk Tools disks yourself, using DiskCopy; the disk images are included on the Mac OS 8.1 CD. Look in the Disk Tools Images folder.)

With this double-partitioned setup, you'll always have a copy of 8.1 at your disposal—without wasting more than a few megabytes of storage space. If you attach your drive to a Mac that can't access your HFS+ volume, just reboot from the HFS partition and you'll have full access to all your files. **m**

JOSEPH SCHORR is coauthor of the forthcoming *Macworld Mac Secrets*, fifth edition (IDG Books Worldwide, 1998).



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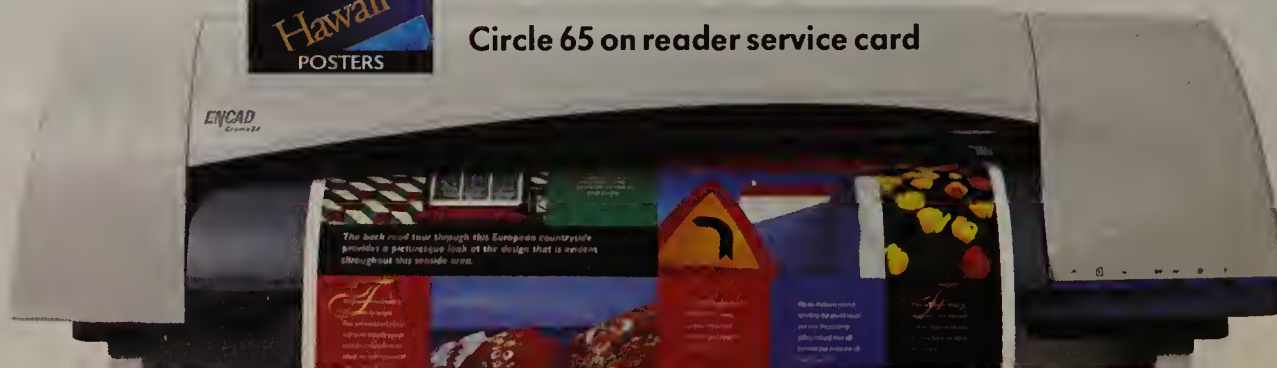
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## Tips, Tricks, and Shortcuts

by Lon Poole

You don't have to restart your computer to implement a new system font chosen from Mac OS 8's Appearance control panel, according to Chris Dreessen of Danville, California. Chris points out that if you hold down the option key while selecting a font, the change occurs immediately. You can install nonstandard fonts—such as the freeware font Virtue and shareware font Nu Sans-Bold, by Marty Pfeiffer, and the Tecton and Veritas fonts from Greg Landweber's Kaleidoscope shareware—by using ResEdit to modify the sfn# resource ID 0 as described in "More System Fonts," *Quick Tips*, January 1998.

### Getting More Drive

**Q** How do I add an internal hard drive to my Mac's expansion bay? Is it just a matter of changing the new hard drive's SCSI ID and making sure that the drive's SCSI port is compatible with the Mac's SCSI cable? Will the hard drive automatically mount?

NYANISO RAHOTEP  
Atlanta, Georgia

**A** All Macintoshes use the same type of ribbon cable and connector for internal SCSI connections (and the same power connector too), so there's no risk of that kind of incompatibility. But Macs don't all accept the same type of mounting bracket, so make sure that the drive you buy comes with the correct mounting bracket for your make and model of Macintosh.

Before installing the new drive, you may need to change its SCSI ID so it

doesn't conflict with other internal SCSI devices. A factory-installed SCSI internal hard drive uses ID 0, and an internal SCSI CD-ROM uses ID 3.

Also make sure the new drive's SCSI ID doesn't conflict with the IDs of any external SCSI devices connected to your Mac. (This isn't a concern if your Mac has a separate external SCSI bus, found in computers such as the Quadra 900 and 950; Power Mac 7300, 7500, 7600, 8100, 8500, 8600, 9500, 9600, and G3; DayStar

the drive to the mounting bracket that comes with it. Then remove your Mac's case and note the location of the SCSI ribbon-cable connector and the power plug near the back of the expansion bay. Install the drive-and-bracket assembly in the expansion bay, and plug the computer's spare SCSI and power connectors into the drive. Then put your Mac's cover back on. When you start up your Mac, the new disk's icon will automatically appear on the desktop.



Digital Genesis LT and Genesis MP; Power Computing PowerTower Pro and PowerWave; and Umax SuperMac J700 and SuperMac S900.)

You may also need to configure the new internal drive's SCSI termination. (IDE and ATA drives do not have SCSI IDs or termination.) Check the drive's documentation for detailed instructions on configuring its SCSI ID and termination.

After ascertaining your new SCSI drive's ID and built-in termination, attach

### Banish an Unruly Folder

**Q** A former America Online folder has defeated all classical attempts to be removed, including strategies such as holding down the option key while emptying the Trash, restarting with extensions off, renaming the folder, replacing the folder with another folder of the same name, and installing new system software.

If I try to put anything inside of the folder, the Finder says the folder cannot be found. When I move the folder

to the Trash, the Finder reports an Error Type -127 but still moves the folder. When I try to empty the Trash, I get a warning that the folder can't be deleted because it contains items that are in use—but the folder is zero kilobytes in size. Any ideas?

J. ROY NELSON  
Pennington, New Jersey

**A** Error Type -127 is an internal file system error and usually indicates a corrupted disk directory. Your other symptoms corroborate this diagnosis.

*continues*



You may be able to fix the problem with Disk First Aid (which comes with System 7.0 and later) or the Norton Disk Doctor component of Norton Utilities, from Symantec (408/253-9600, [www.symantec.com](http://www.symantec.com)).

If neither helps zap your belligerent folder, you'll probably have to initialize (erase) or reformat the hard disk. But don't forget to carefully back up the disk's contents before erasing or reformatting!

## Trace URL Routes

**Q** I'm looking for a quick and easy way of seeing the route that my URL request takes to find its destination. I've learned that Windows NT has a command called "tracert" (trace route), which displays the path taken (as a listing of networks) from your computer to a particular URL. How can I do this on my Mac?

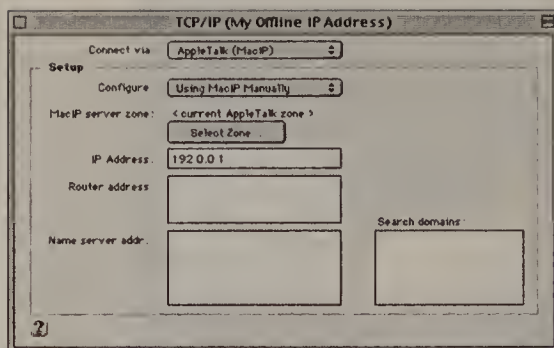
MARK KLITZKE  
Methuen, Massachusetts

**A** There are several ways on the Mac to learn the names of the machines your request passes through to reach a specified URL or IP address (useful for troubleshooting a slow connection to a particular IP address or comparing the efficiency of different ISPs). You can get this information from the \$10 shareware Mac TCP Watcher 2.0, by Peter Lewis, or the freeware WhatRoute, by Bryan Christianson. Your Mac must be using Open Transport 1.1 or later to get route information with these utilities.

Mac TCP Watcher can also test whether your Mac's TCP/IP setup and Internet connection are functional, and it can test the DNS (domain name system), which is the Internet service that converts server names to numeric IP addresses such as 205.199.66.216. These features don't require Open Transport, as they also work with classic networking schemes. (Your Macintosh uses Open Transport if it has a TCP/IP control panel, or classic networking schemes if it has a Mac TCP control panel.)

## Preserving EMailer Address Groups

**TIP** If you've ever had to export your Address Book from Claris EMailer 2, you know that you can't export address groups, only individual addresses.



**Faking an Offline IP Address** To preview your Claris FileMaker Pro 4.0 database in a Web browser while not connected to the Web, create a new configuration in the TCP/IP control panel and set its Connect Via, Configure, and IP Address options as shown here (leave all other options blank). The IP address becomes part of the URL for your FileMaker Web site—in this example, <http://192.0.0.1>.

But if you want to load a copy of your Address Book onto your PowerBook, for example, a slick workaround will save you the hassle of re-creating address groups from scratch—and will also let you easily share address groups with fellow EMailer users. All you need is Macintosh drag and drop, which is built into System 7.5 and later.

First, open the EMailer Address Book window and drag an address group from the window to the desktop. This creates a text-clipping file that contains every address in the group, each formatted as *mailto*: "Quick Tips" [quicktips@macworld.com](mailto:quicktips@macworld.com), for example.

To re-create the group, simply drag the text-clipping file into the address area of EMailer's Address Book window. Voilà! EMailer automatically creates a new group containing all of the addresses from the clipping file. Just type in a group name and you're done.

TROY S. CURTIS  
Phoenix, Arizona

## No-Charge Database Previews

**TIP** If you want to use Claris FileMaker Pro 4.0's Web Companion features to publish a database on the Web and you have a dial-up Internet connection, you can preview your database in a Web browser without connecting to the Internet and adding charges to your dial-up account. All you need to do is fool TCP/IP into thinking you have been supplied with an IP address.

Open the TCP/IP control panel, choose the Configurations command from the File menu, and make a duplicate

of your default configuration in the Configurations dialog box. Click the Make Active button with the duplicate selected. Then set up the TCP/IP options for the duplicate as shown in "Faking an Offline IP Address." Next, use FileMaker Pro 4.0's Sharing command to privately publish your database with your new faked offline IP address. Turn on the Sharing command's Web Companion option. (If the Web Companion option was already on when you changed the TCP/IP configuration, quit FileMaker and reopen it so that it uses your new faked offline IP address.)

Now you can view your database in Netscape Navigator or Microsoft Internet Explorer by specifying the URL <http://192.0.0.1> (this is the IP address you specified in the TCP/IP control panel).

When you're ready to publish your database on the Internet, quit FileMaker and open your TCP/IP control panel. Call up the Configurations dialog box again as before, select your regular default configuration, and click Make Active. Then connect to the Internet (using the PPP or Config PPP control panel, for example) and reopen the FileMaker database you want to publish. Look in your TCP/IP control panel for the IP address people must specify in the URL (of the form <http://206.14.59.41>, for instance) to get to your database site.

Now when your Mac is connected to the Internet, anyone can use a Web browser to access your database.

TONY FALLA  
North Fitzroy, Victoria, Australia

## Access Eudora Remotely

**TIP** Do you want to access your Qualcomm Eudora mailbox from a remote Mac over a network? First, turn on file sharing on the Mac with your Eudora mailbox, using either the File Sharing or Sharing Setup control panel. Then select the Eudora Folder inside that Mac's System Folder and choose Sharing from the File menu to access the Eudora Folder's sharing-options window. In this window, select the option Share This Item And Its Contents and set the access privileges to prohibit access by Everyone (that is, by guests).

Now you can access your shared Eudora Folder from a remote Mac on the

*continues*



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network—including a Mac connected to the network via modem and Apple Remote Access software.

Connect to your original Mac, and access its shared Eudora Folder by using the remote Mac's Chooser. Make an alias for the Eudora Folder icon that appears on the remote Mac's desktop, and put the alias in that Mac's System Folder. Open the System Folder, drag the remote Mac's original Eudora Folder onto the desktop (or into the Trash if no one will need to use its mailboxes and address book), and change the name of the Eudora Folder alias to Eudora Folder.

Now when you launch Eudora on the remote Mac, the Mac uses the Eudora Folder alias to access the Eudora Folder on your original Mac. You can access your mailboxes, queue messages, and so forth across the network.

If you need to restore the remote Mac's local mailboxes and address book, just drag the Eudora Folder alias from

the remote Mac's System Folder to the Trash, and drag the original Eudora Folder back into the System Folder.

CLEMENT TOPPING  
Montreal, Quebec, Canada

*The files in the Eudora Folder can be opened only by one copy of Eudora at a time, so you can't leave Eudora open on your original Mac if you want to access the Eudora Folder over the network. While working from a remote Mac, it's a good idea to save new messages and changes to your address book often, in case the network connection breaks unexpectedly.—L.P.*

### Vary Slide-Show Timing

**TIP** You can display images at varied intervals in a timed slide show without expensive presentation software—and even without the macro/shareware solution suggested in “Slipping Slide Show” (Help Folder; January 1998). A very

simple method works in any program, including ClarisWorks, that will show a series of slides.

To show an individual slide longer than the normal specified interval, just include two or more of the same slide in sequence. For example, if the slide show program is set to advance slides every 30 seconds, you can make one image visible for 60 seconds by including two identical images in sequence. The only limitation of this method is the extra disk space required by the duplicate slides.

ROBERT WRIGHT  
Bryn Mawr, Pennsylvania

*If your software can layer slides, you can minimize the extra disk space needed by adding blank transparent slides after the slide you want displayed longer.*

*Another solution is the \$15 shareware View Finder, from Autumn Software ([www.autumnsoft.com](http://www.autumnsoft.com)). It lets you combine pictures, text, QuickTime MIDI, voice-over, and other sounds into an automated slide show. You can use transitions, and you can specify how long View Finder displays each image.—L.P.*

### You Can See Clearly Now

**TIP** To save wear and tear on cable connectors and ports, attach a mirrored tile to the wall behind your computer. This lets you see what you're doing while connecting and disconnecting cables, and saves you from having to move your computer back and forth while doing so.

AL HART  
Clinton, Michigan

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld Mac OS 8 Bible* (IDG Books Worldwide, 1997).

Shareware mentioned in *Quick Tips* is available from Macworld Online ([www.macworld.com](http://www.macworld.com)) or America Online (keyword Macworld; use keyword Apple for Apple software).

We pay \$25 to \$100 for tips on how to use Macs, peripherals, or software. Please include your full name and address, so that we can send you your payment. Send questions or tips to [quicktips@macworld.com](mailto:quicktips@macworld.com) or to Macworld Quick Tips, 501 Second St., San Francisco, CA 94107. All published submissions become the sole property of *Macworld*. Due to the high volume of mail received, we cannot provide personal responses. **m**

## A Little April Fool's Fun

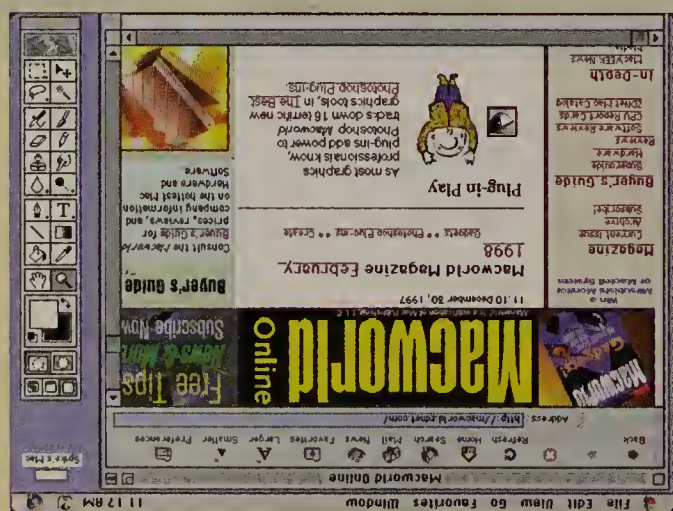
For a practical joke the Three Stooges would appreciate, invert the screen image on the Mac of an unsuspecting friend. If the victim's Mac has Adobe Photoshop, you can pull this prank with the method sent in by Joseph Holmes of Kensington, California.

First, wait until your victim goes for coffee. Then sneak over to the person's Mac and make a screen shot of the

current screen image by pressing ⌘-shift-3. Open the screen-shot file (which will have a name such as Picture 1 or Picture 2) in Photoshop, and rotate the canvas 180 degrees. Zoom to 100 percent, and select the full-screen display mode in the lower right corner of the Photoshop tool bar. To complete the effect, hit the tab key to hide the Photoshop tool bar and any open Photoshop palettes. Leave Photoshop open, and scurry away before your victim returns.

You'll need at least a solid minute or two at the victim's computer to pull this off, so practice on your machine beforehand to cut down on lag time.

After setting up this gag, lurk nearby and witness the payoff. When you hear the satisfying “What the . . . ?!” let loose with a Curly-esque “Nyuk, nyuk, nyuk”—but be prepared to fend off a Moe-esque two-finger eye poke.



**The Old Upside-Down-Screen Gag** No, we didn't print this screen shot upside down. (Look closely at the tool bar for proof.) With a little work in Adobe Photoshop, you can freak out your favorite Macaholic on April 1 by inverting the person's screen image.



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Dot Pitch	0.26mm
Maximum Resolution	1,280 x 1,024
Recommended Resolution	1,024 x 768 @ 87Hz

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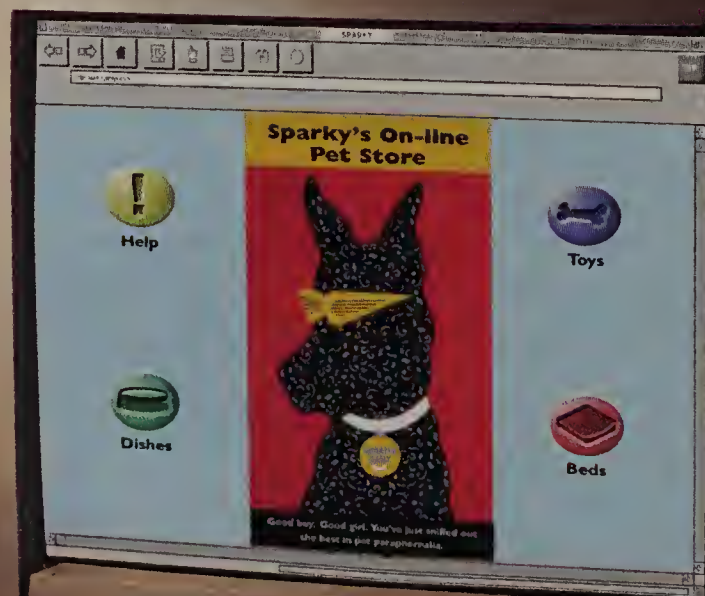
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11:00



11:06



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## create

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## Spot Color and Photoshop—Oil and Water?

Tricks to Make Photoshop and Spot Color Mix

by David Blatner and Sandee Cohen

**O**ut of all the Adobe Photoshop questions we've been asked over the years, we get one more than any other: "How do I get a true Pantone spot color in Photoshop?" The awful truth is that you can't use a spot color in Photoshop to paint or fill an area. But that doesn't mean you can't get Photoshop to give you what you want. In this article, we'll show you a couple of workarounds that trick Photoshop into giving you spot color. First, it's important to know how spot colors are different from process colors and why Photoshop has trouble with them.

### Spot Color versus Process Color

Process color lets you simulate a color by overlaying varying tints of cyan, magenta, yellow, and black. Look with a magnifying glass at any color magazine image, and you'll see that there are only four colors in it, each printed with tiny halftone spots.

Spot colors (such as Pantone colors) are inks that exactly match a particular color. For instance, if your company logo requires black plus a single color, it's best to print with black ink and a spot color. It would be silly to print with four inks just to get one color. Also, there are some colors—such as electric blue and bright gold—that just can't be simulated with process colors. Most two- or three-color jobs are printed with spot colors. Spot color would not be appropriate, however, for most full-color jobs—you'd go crazy trying to mix thousands of inks for tiny parts of an image.

### How Photoshop Handles Color

When it comes to describing color in Photoshop, spot colors get short shrift. You can easily describe RGB and CMYK colors in Photoshop, because behind the scenes each pixel is broken down into so much cyan, so much magenta, and so on. But there's no way to tell Photoshop that your image is CMYK *plus* a spot color, such as Pantone 286.

When you select a Pantone color in Photoshop's color picker, you don't get a true spot color. You get an RGB or CMYK representation of that color (depending on the mode of your image). When you print

separations of the color image, even though you'll want the Pantone color to show up on its own piece of film, it won't. It'll separate out into process colors.

The only time Photoshop gets spot colors right is when you're building a duotone (see "Add Richness with Spot-Color Multitones"), but duotones aren't useful for logos, two-color illustrations, and most other jobs that require spot colors.

### The Channel Trick

Fortunately, there are a couple of methods for tricking Photoshop into working *continues*





with spot colors. The most common technique is to create a new channel in the Channels palette. To do so, follow these steps:

1. Option-click on the New Channel button in the Channels palette.

2. In the Channel Options dialog box, choose the spot color you want (click on the color swatch). This is for preview only, so you can pick any color that's close to the one you're aiming for.

3. Change the Opacity field to 85 percent. The exact amount is unimportant—since this step is also only for preview use—but 85 percent tends to simulate the opacity of a spot color reasonably well.

4. Change the name of the channel to the name of the spot color.

5. Select this new channel to paint on (it should be selected automatically when you click on OK), and then click in the eyeball column of the composite-color channel (the one labeled RGB or CMYK).

Now, when you paint on this channel (but not the other channels), it will appear as though you're painting in the spot color. This trick has gotten us out of all kinds of spot-color jams, but there are a few things you need to watch out for when using it.

First, the screen doesn't show you a good preview of how the color will look or how it will interact with the other colors on the page. So knowing this spot color's characteristics—such as how opaque it tends to be—will make it easier to translate what's on screen into what comes off the press.

Next, you have to use a Photoshop plug-in to separate these images correctly. Two plug-ins that do this are Platemaker (\$199, from a lowly apprentice productions) and Channel/24 (the only way to get it is with the \$350 MC-P/Co-Co, a plug-in we discuss later). These plug-ins save the image in a DCS 2.0 format that can be opened in and printed from QuarkXPress or PageMaker.

The third problem is that if your spot colors overlap with any other colors, you must manually "knock out" the background colors by deleting them from those areas (unless you want the spot color to overprint the background colors).

If you're using spot colors as bump plates or varnishes, you owe it to yourself to check out the MC-P/Co-Co plug-in (from Visu Technologies and distributed by Pantone). It's expensive,

## Add Richness with Spot-Color Multitones

THE ONLY PHOTOSHOP FEATURE THAT SAVES SPOT COLORS CORRECTLY (ON THEIR own plates) is Duotones. Historically, printers have coaxed more depth and detail out of gray-scale images by printing them not only with black but also with two, three, or even four spot colors (you can use process colors, too). These images are called duotones, tritones, or quad-tones (the collective word is *multitones*). The effect isn't meant to colorize the image, although some designers use it for this purpose (often with ugly results).



Original gray-scale image

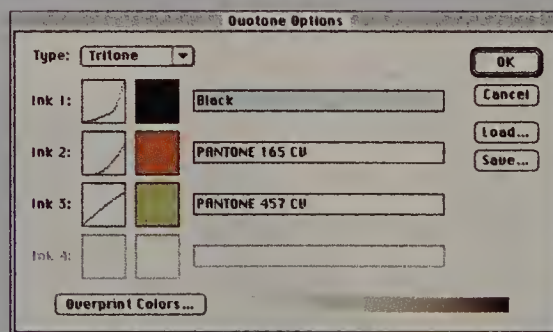


Tritone image

### Converting to Multitone

You can turn a gray-scale image into a multitone in Photoshop by choosing Duotones from the Mode submenu (on the Image menu). Next, load one of the settings that comes with Photoshop (click on Load, and navigate to the Duotone Presets folder, which is inside the Goodies folder in the Photoshop folder). You can try to create your own set of curves, but it's deceptively difficult to get a good-looking image.

There are three different types of presets: Grays, Pantones, and Process Multitones. Choose one of the first two if you're printing with spot colors. Choose the third if you're printing with process colors. Even if you aren't using exactly the same color inks as the ones in the presets, these curves will provide an excellent jumping-off point. Just find a set with colors similar to the inks you're using. You can change the color and tone curve later (just don't change them much).



Click on a color box to change the color

Click on a curve to view or change the curve

Click on Load to load a set of curves and colors from disk

but if you do a lot of this sort of work, you'll find that it pays for itself.

### The CMYK Trick

Another method for creating spot colors in Photoshop is to use the cyan, magenta, yellow, and black channels as spot-color channels. For instance, if you're creating a two-color image with black and a burgundy spot color, you could put the black on the black plate and the burgundy on the magenta plate. When you bring your separations on film to your

print shop, you'll need to specify that the magenta plate is actually supposed to be printed in the Pantone color you want. (It's a good idea to write the Pantone color on the film itself, just in case.)

The problem here, of course, is that the screen preview is completely wrong. Fortunately, you can change the way Photoshop defines its process colors, in the Printing Inks Setup dialog box. If you redefine magenta as the Pantone burgundy you're using, the screen preview will be much closer to the final out-



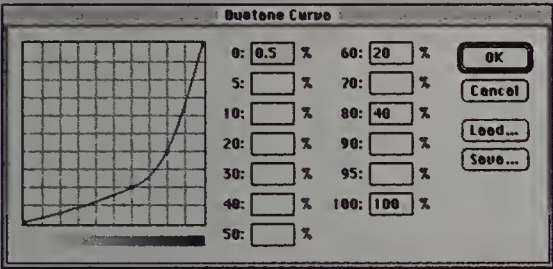
Dissecting a Multitone Curve

Photoshop builds multitone by applying a series of tonal curves (one per ink). Analyzing curves helps you understand the principles behind multitone. To see how, let's look at a tritone made of black, Pantone 165, and Pantone 457 (because our magazine is printed with process colors, we have to simulate the spot colors here).

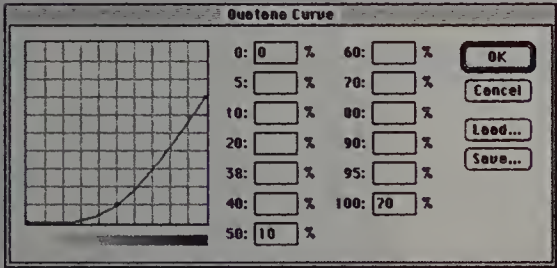
**Black Ink** This curve suppresses almost all the black in the highlights and midtones. But the shadows have a normal amount of black. This lets the other colors hold the image in the highlights and midtones but gives the image good details in the shadows.

**Pantone 165** This curve suppresses almost all the detail in the highlights but boosts color in the midtones and shadows.

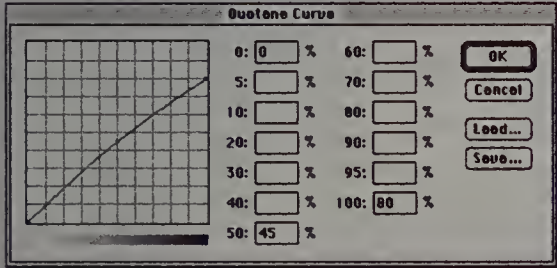
**Pantone 457** In this curve, the light-brown/green Pantone carries most of the detail in the highlights and midtones but is only partially present in the shadows. Both the orange and the brown/green are suppressed at the 100 percent mark, avoiding ink buildup in the deep shadows while maintaining a rich black.



Black ink



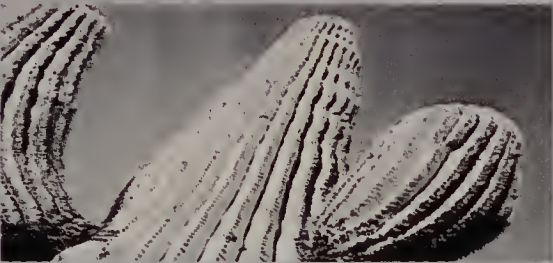
Pantone 165



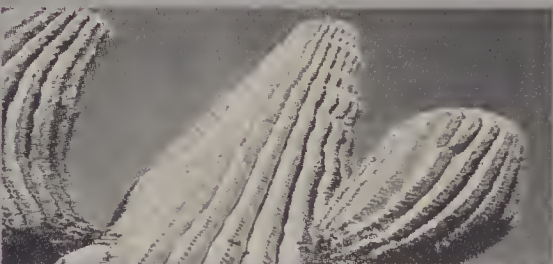
Pantone 457

Viewing the Plates

It's helpful to be able to see each spot-color plate individually, as you can in the RGB and CMYK modes. Unfortunately, that's not possible in the Duotone mode. However, if you convert the multitone to Multichannel mode (on the Mode submenu), you can see each ink on its own channel (the first ink is the first channel, and so on). You cannot perform adjustments to the individual channels, since there is no way to assemble them back into the Duotone mode, so this is just for viewing a preview. When you're done looking, select Undo (⌘-Z) to return to the Duotone mode.



Black plate



Pantone 165 plate



Pantone 457 plate

Saving Duotones

Note that in order to print your duotone from QuarkXPress or Page-Maker properly, you must save it out of Photoshop as an EPS file. Then, in the page-layout program, make sure the spot colors you're using are in your color list (the names must be identical). The spot colors are usually created for you when you import the EPS file (just don't delete them).

put. (Don't forget to change the Printing Inks Setup back to SWOP or whatever ink setting you're using, before trying to do color separations.)

Spot-Color Futures

Someday the folks at Adobe are going to wake up from their process-color dreams and realize that tens of thousands of their Photoshop users use spot color every day. We look forward to a time when these workarounds are no longer necessary for something as simple as creating text in a

spot color or building a spot-color logo in Photoshop. In the meantime these workarounds can help you squeeze quality spot-color artwork out of Photoshop. **m**

DAVID BLATNER is the coauthor of *Real World Photoshop 4* (1997, Peachpit Press) and *The QuarkXPress 4 Book* (1998, Peachpit Press). You can contact him at david@moo.com. SANDEE COHEN is a New York-based desktop-publishing trainer and consultant and the author of two *Visual Quickstart Guides* for Peachpit Press. You can contact her at sandeec@aol.com.

Bookmarks

- Channel/24**  
A plug-in from Visu Technologies/Pantone  
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- Platemaker**  
A plug-in from a lowly apprentice productions  
www.alap.com
- Second Glance**  
Makers of spot-color plug-ins  
www.secondglance.com
- Spot Process**  
Plug-ins for high-end silk-screening  
www.spotprocess.com



## Spot Color and QuarkXPress 4

Make Two Colors Look Like a Full Array

by David Blatner

**H**ave you ever noticed that the people who yell the loudest for a new technology are the ones who stand to make the most money from it? For example, the print industry can become positively apoplectic when expounding on the glories of six- or seven-color printing on high-end waterless presses. Unfortunately, their hype often drowns out the simple truth that the majority of us can't afford such extravagance and must settle for down-to-earth two- or three-color print jobs instead.

However, just because you're printing with two colors doesn't mean that your finished piece has to look as if you've used only two colors. Just as you can mix process colors (cyan, magenta, yellow, and black) together to make thousands of other colors, you can add a medley of colors to your pages by combining spot colors. (For more information on spot versus process colors, see "Spot Color and Photoshop—Oil and Water?" elsewhere in this issue.)

For instance, if you use red and black inks in your document, it's easy to print light reds by tinting the red ink. Why not use dark reds, too, by mixing red and black together? If you're printing with red and blue, why not add purple to your pages by combining the two inks? By changing the tints of each ink, you can make many different shades of a color.

Here's how QuarkXPress 4 lets you make those shades.

And to help make sure your print jobs go smoothly, I offer some tips on avoiding some common mistakes.

### Troubles Behind

In the past, the only reasonable way to mix spot colors together was to overprint two

objects—set one object to one color and then set the other object to a second color. This was not only cumbersome, but it also meant that you couldn't preview the final color on-screen or on most color printers. Fortunately, QuarkXPress 4 has taken a

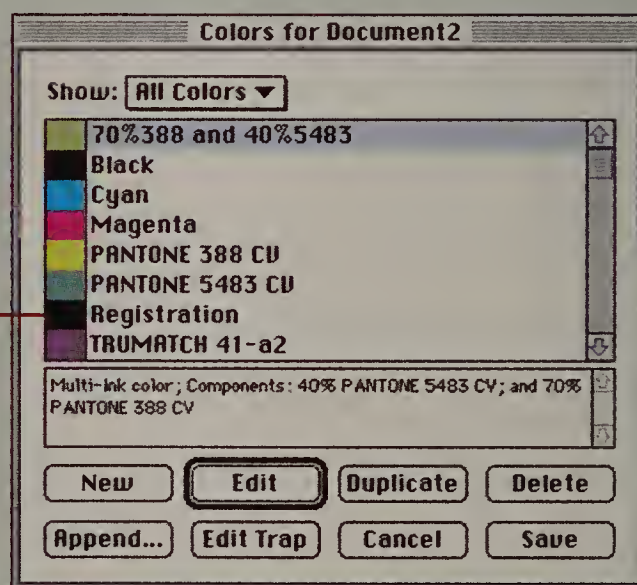
quantum leap in mixing spot colors, with its introduction of Multi-Inks.

Multi-Inks are a new ink model in XPress, much like CMYK or RGB. However, instead of choosing combinations of process colors or red, green, and blue, you specify a

## Building a Multi-Ink Color

Multi-Ink colors are mixtures of other colors. Here are a few tips to help you build them.

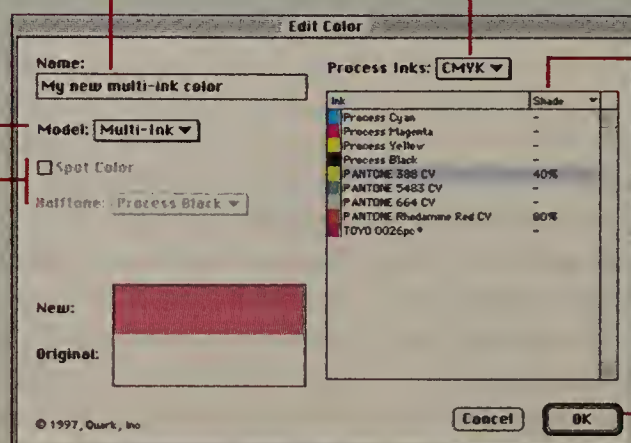
Before you can make a Pantone color part of a Multi-Ink color, you first have to create the Pantone color.



Choose Colors from the Edit menu or ⌘-click on a color in the Colors palette to open the Colors dialog box. Then click on New to create a new color.

**TIP** To compare the makeup of two colors, first ⌘-click on them. Then hold down the option key and press on the Compare key that appears.

Choose Multi-Ink here. These options are grayed out because Multi-Ink colors are neither process nor spot colors.



If you're printing with Hexachrome inks, choose Hexachrome from this pop-up menu. Otherwise, leave it alone.

Click on a color and choose a tint from the Shade pop-up menu. (To apply the same tint to more than one color, ⌘-click on the colors first.)

Click on OK when you're finished building your color.



Multi-Ink color as a mixture of other colors in your color list. And because you can mix process and spot colors, a Multi-Ink might be 100 percent cyan plus 30 percent Pantone 110. Or 20 percent Pantone 265, 40 percent Pantone 226, and 10 percent black.

A Multi-Ink color appears in the Color palette just like any other color in XPress, so you can use it in your document easily. XPress displays on-screen an approximation of how the two (or more) colors will print together (but see “Swatch Books” for caveats).

When you print (with the Separations check box checked in the Print dialog box), each color in the Multi-Ink color will appear on its proper plate. In the example I gave earlier, the 20 percent Pantone 265 would be on the Pantone 265 plate, and so on. See “Screen-Angle Madness” for more information on printing Multi-Ink colors.

Note that no other high-end DTP program on the market as of this writing—including Adobe Illustrator and Macromedia FreeHand—is able to handle Multi-Ink colors. If you need to use mixtures of spot colors, or spot colors with process colors, you have to create them in XPress 4.

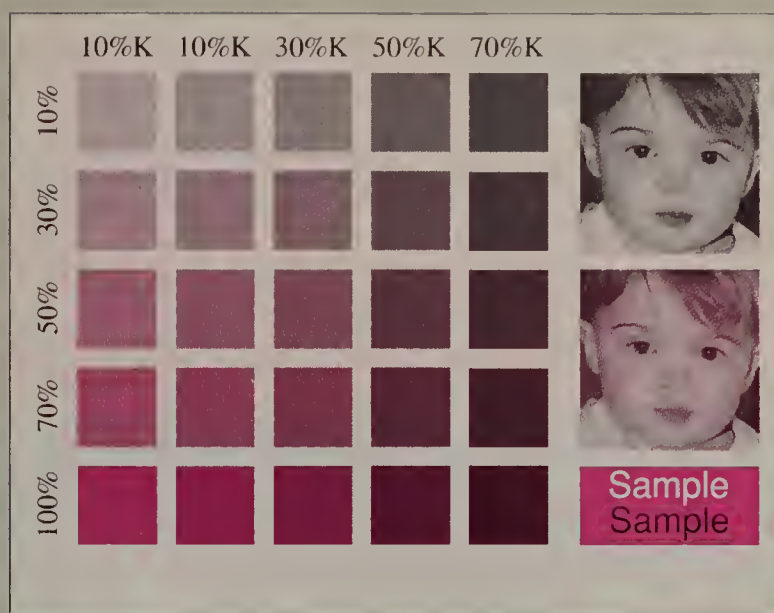
## Ink Issues

When it comes to putting ink on paper, mixing spot colors

## Swatch Books

You’ve probably learned by now that you should never trust a color you see on screen. Even with a calibrated monitor, you often get shifts between what you see and what you get. The trick is to use a swatch book of printed colors. Many people know about using swatch books for picking out combinations

of process colors but don’t realize that Pantone also makes swatch books that show mixtures of its spot colors. It’s got one called *Color+Black* and another titled *Color+Color* that displays combinations of two spot colors. When you build a Multi-Ink color based on a formula in a swatch book, you know what you’re going to get. The example above is similar to a page in the *Color+Black* book.



Note: I couldn’t talk *Macworld* into printing with spot-color inks just for this article, so this illustration is a process-color simulation of spot colors.

isn’t always the same as mixing process colors. The consistency and opacity of spot-color inks are often different from those of process-color inks, because they are usually used for different types of jobs. Some spot-color inks are almost fully opaque, so printing them over another color is useless.

Fortunately, most spot-color inks are semitransparent these days, so unless your printer adds Opaque White ink to the ink mixture, combining them should work.

However, this is a topic worth discussing with your printer first.

Note that metallic inks not only are opaque but also tint extremely poorly. So, don’t try to build Multi-Ink colors by using a Pantone ink such as gold, silver, or copper.

## More Inks, More Colors

Sure, six-color print jobs with varnishes and Day-Glo colors are fun to do. And when you do get a fancy job with six colors, you can use XPress 4’s Multi-Ink feature for those

pieces, too. But while the industry pundits shout about how Hi-Fi color will change the world, don’t forget that you’re not the only one whose bread is buttered with two- and three-color jobs and that the Multi-Ink model can help you make the most of those precious few inks. **m**

DAVID BLATNER is the author of *The QuarkXPress 4 Book*, fifth edition (Peachpit Press, 1998), and *The Joy of Pi* (Walker and Company, 1997). You can reach him at david@moo.com or at the Web site www.joyofpi.com.

## Screen-Angle Madness

What happens when you print one tint over another if both tints use the same halftone frequency and angle? You get moiré patterns, of course. In order to avoid these ugly things, you have to use the proper angles, which are almost always either 45 or 60 degrees apart. For instance, if you’re

mixing a blue and a red, you may want to set blue to 15 degrees and red to 75 degrees.

There are a few tricks to using the correct angles. First, you should set only very light colors to zero degrees (or 90 degrees, which is the same as zero), because the halftone screen is

the most obvious at this angle. That’s why the color yellow is usually set to zero degrees in process-color printing. If you’re printing a purple and a light gray, you might want to set purple to 45 degrees (which is the least obvious halftone angle) and the light gray to zero degrees.



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# Watch This: Streaming Video on Your Web Site

If You Know the Right Tricks, Video Is More Practical Than Ever

by Jim Heid

Getting video to play back on the Internet can be like trying to suck peanut butter through a straw. Video's bandwidth demands can overwhelm the narrow pipes that are phone lines and modems.

Well, pass the Skippy, because advances in video-compression schemes and serving techniques are gradually making Web video practical, even for modem users. And on intranets, the picture is even brighter: local-area networks' (LAN's) wider pipes allow for video quality approaching that of CD-ROM-based movies. Many companies and schools now deliver training videos, lectures, and presentations over intranets.

One key to making Web video practical is streaming: serving clips in a way that lets users view the beginning of the movie while the rest of the clip downloads. Another key is preparing your source material with Web video's limitations in mind. And the third is compression—lowering a clip's bandwidth requirements to accommodate the speed of your delivery vehicle, be it a modem, a LAN, or anything in between.

If you've dallied with digital video, editing your own QuickTime movies with programs such as Adobe Premiere, it's time to start thinking about putting your efforts on the Web. Web video is easier and more economical than ever.

## Technologies Worth Watching

There are several players in streaming video, but the ones to keep your eyes on are RealVideo, from RealNetworks, formerly Progressive Networks (206/674-2700, [www.real.com](http://www.real.com)), and VivoActive, from Vivo Software (781/899-8900, [www.vivo.com](http://www.vivo.com)). They're the most popular streaming-video technologies, and with good reason: each provides easy-to-use compression software, a variety of ways to deliver video to your visitors,

and video that looks surprisingly good.

The basic production process is the same for both technologies. You create video as you would for CDs or broadcast: digitizing scenes from videotape and then editing them into a finished QuickTime movie. Next, you compress that movie with encoder software. Finally, you stash the encoded movie on a server and create a Web page containing links to it.

To view video, your site's visitors need the right playback software. For RealVideo, that's RealNetworks' free RealPlayer or \$29.95 RealPlayer Plus (which has features for improving playback quality and buttons that let users jump to their favorite sites). RealPlayer and RealPlayer Plus are helper applications, but when installing either one, you also install a plug-in module for playing video that has been embedded into a page rather than simply linked to it.

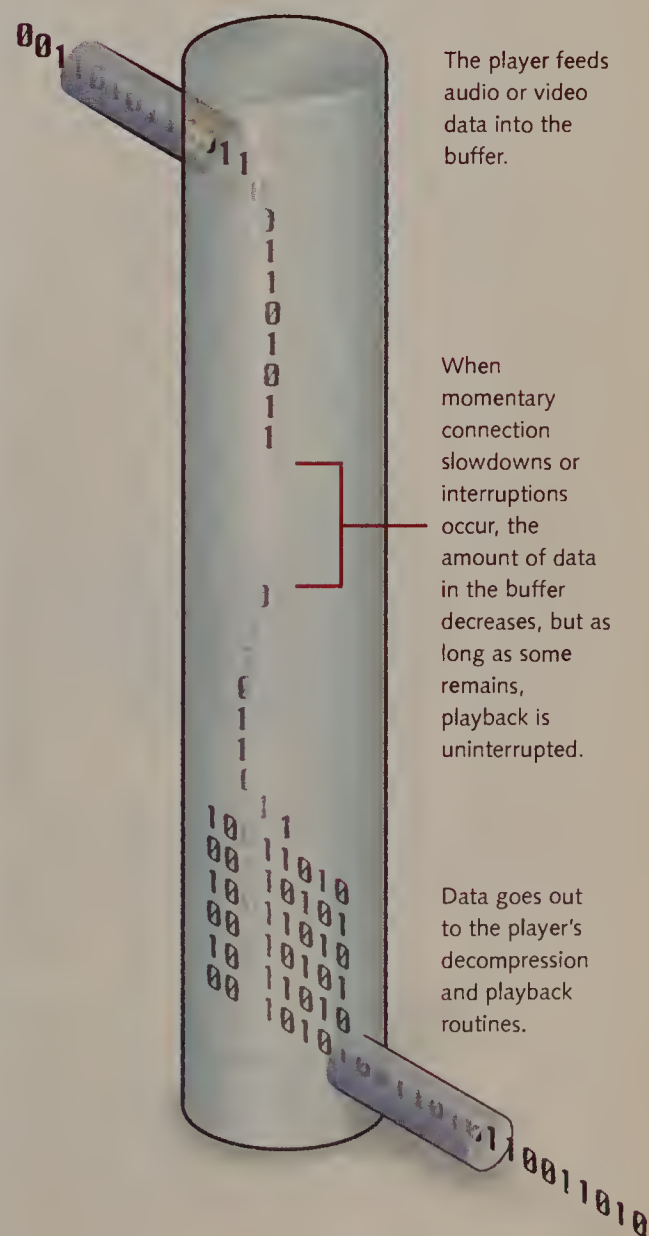
For VivoActive video, your visitors can download the free VivoActive plug-in module or purchase the \$12.95 VivoActive PowerPlayer, a stand-alone helper application that provides additional features, such as a volume control and the ability to play movies at larger sizes.

Apple's QuickTime 3.0, in public beta testing at this writing and due to ship by the time you read this, also shows great promise for streaming video. Apple has built into QuickTime 3.0 a remarkable new compression technology called Sorenson Video, from Sorenson Vision (408/970-0696, [www.s-vision.com](http://www.s-vision.com)). Sorenson Video compression enables QuickTime 3.0 to stream reasonably high-quality movies at modem speeds. QuickTime 3.0 also lets you create *multiple-data-rate* movies: ones containing more than one version of a movie, each compressed for a given connection speed. The new QuickTime browser plug-in automatically selects and downloads the appropriate version. To learn

*continues*

## Buffering for Interruption-Free Playback

One key to streaming media is the process of buffering. The player software downloads part of the movie or sound file and stores it in memory before playing it. Think of a buffer as a container with pipes at top and bottom. The player fills the buffer from the top. Once the container is full, the player sends data on for playback from the bottom. Data keeps coming in as a clip plays. The "water level" may change, but there's always a supply of video or audio data.





more about QuickTime 3.0's capabilities, see [www.apple.com/quicktime/](http://www.apple.com/quicktime/).

## How Compression Kills Quality . . .

RealVideo and VivoActive rely on compression to reduce bandwidth requirements. Encoding a movie for streaming video is conceptually similar to compressing a movie for CD-ROM: both processes decrease the amount of data in the movie through temporal compression (removing information that stays the same from one frame to the next; say, a stationary object) and spatial compression (removing redundant information within each frame; for example, the many pixels with identical colors in a blue sky).

There is one big difference: transfer

rates for CD-ROM drives are much faster than those for the Internet or even most LANs. So Internet-destined movies need smaller frame sizes and slower frame rates than their CD-based cousins. While a CD-based movie might have 320-by-240-pixel frames and a rate of 15 frames per second, a RealVideo or VivoActive movie might measure just 160 by 120 pixels and have a frame rate of between 3 and 5 fps.

## . . . And What You Can Do about It

**Shoot and edit with the Internet's limitations in mind, and your final product will look better and play more smoothly.**

**Minimize motion.** The more movement you have from one video

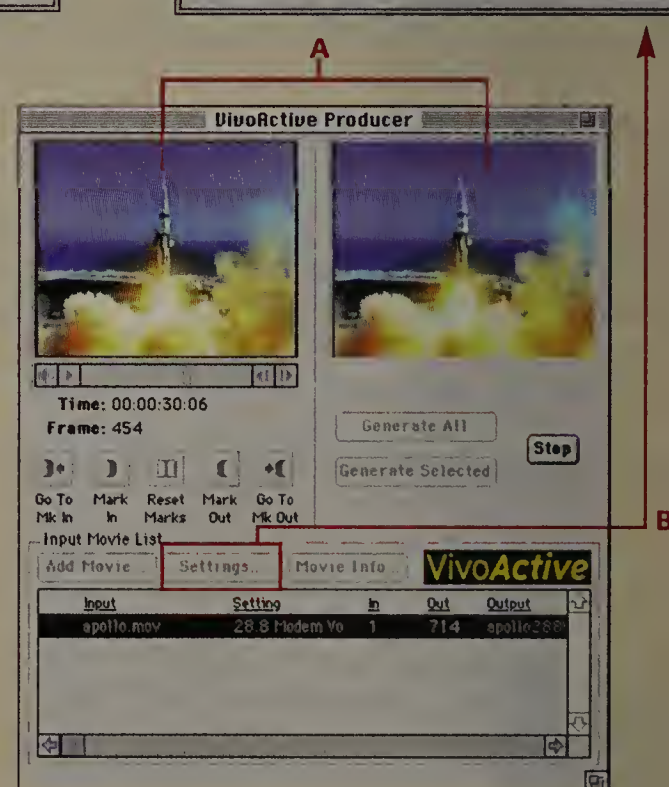
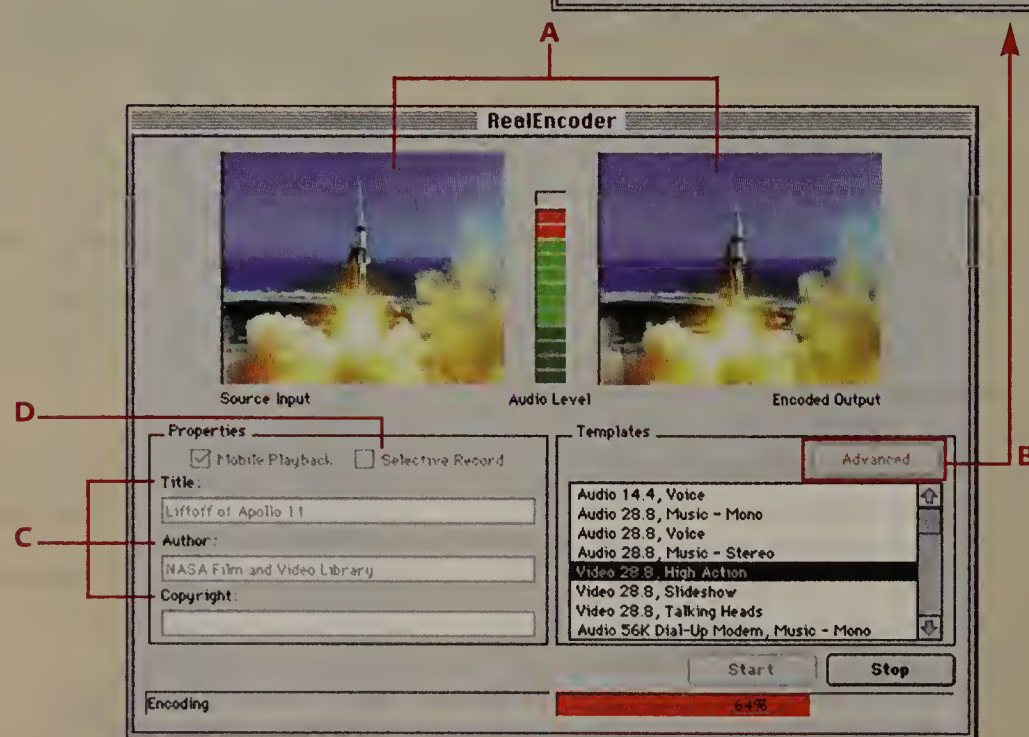
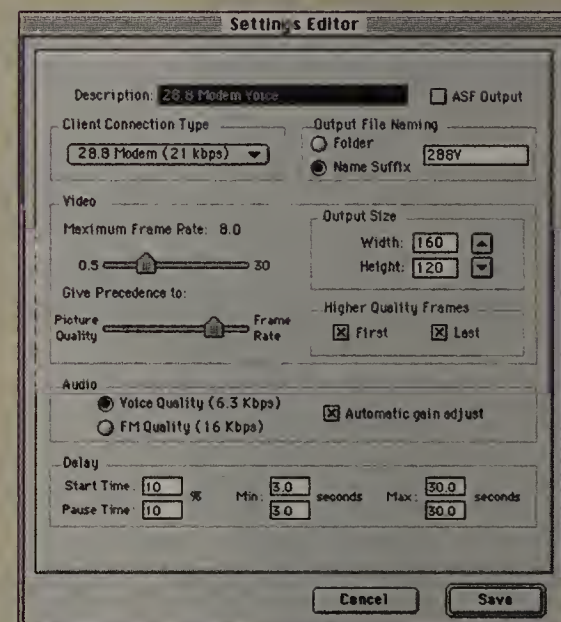
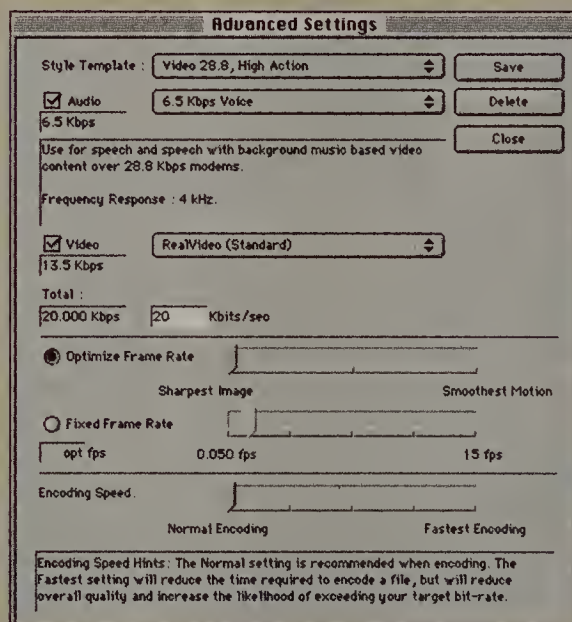
frame to the next, the less those frames will compress. To decrease the amount of change between frames, use a tripod and minimize panning and zooming.

**Decrease detail.** Video of an actor in a plaid jacket standing before a city skyline is chunkier and fuzzier than video of an actor all in red standing before a blue wall. Large areas of solid color yield better spatial compression. Go for bright colors: yellow, light blue, red, pink. Dark colors generate more video noise, which compresses poorly.

**Light your subject.** Shadows are prone to video noise, so light your scenes well—avoid indoor shoots under existing room light. Shoot in the highest-quality format you can afford: Betacam, digital-

## Inside Encoders

RealEncoder (left) and VivoActive Producer (right) work similarly. After you specify a QuickTime movie and the desired target bandwidth setting, each program compresses the video, lowering the frame rate and adjusting (read: degrading) image and sound quality to fit within your target bandwidth.



**A** Both encoders display before and after views of the movie while encoding.

**B** To customize the quality and data-rate settings, click here and enter specified settings in the resulting dialog boxes.

**C** The Title, Author, and Copyright information you enter here appears in the RealPlayer during playback.

**D** Checking Selective Record lets surfers save a RealVideo movie for later viewing.



videocassette, and Hi-8 equipment all deliver less noise than S-VHS and VHS.

**Cut quickly.** In editing, think twice about using transitions, even such mainstays as dissolves and wipes. Use jump cuts—switching suddenly from one scene to another—whenever possible. Avoid rapid-fire cutting too. It takes time for video to sharpen up after a change of scene, and the more cuts, the more fuzziness your viewers must endure.

### Using Existing Video

The advice above yields relatively sharp, albeit somewhat bland, Web video. But what if you have existing video that violates every rule in the book? One option is to simply compress the video as-is and let the pixels fall where they may. You'll get chunky, jerky results, but Web users are often willing to forgive some flaws in exchange for a look at the cutting edge.

### Speaking Encode

To prepare your video for Web viewing, you need encoder software that supports your streaming-video technology. For RealVideo, that is RealNetworks' free RealEncoder (you can download it from [www.real.com/encoder/](http://www.real.com/encoder/)). For VivoActive, you need either Vivo's \$199 VivoActive Producer or the company's \$49 VideoNow. The latter supports only one frame size (a tiny 160 by 120 pixels), encodes for modem speeds only (no ISDN or faster), and lacks several quality-optimizing settings.

These encoders all work similarly. You specify a QuickTime movie to encode, and then you choose a preset combination of settings for movie frame size, frame rate, and sound quality (see "Inside Encoders"). You can fine-tune these settings or create new ones, but the presets are adequate for most efforts.

RealEncoder includes an Adobe Premiere export plug-in that provides features for controlling exactly which video frames are encoded. If you edit in Premiere, this plug-in can yield better-quality video, particularly with video that was not shot with the Web in mind (see "Encoding RealVideo in Adobe Premiere").

Regardless of which encoding tool or streaming technology you use, it's a good idea to create multiple versions of a movie, each tailored for a specific bandwidth. The most common ones are 28.8-Kbps and 56-Kbps, but if you have the time, consider creating a 128-Kbps (ISDN) version too.

### Serving Strategies

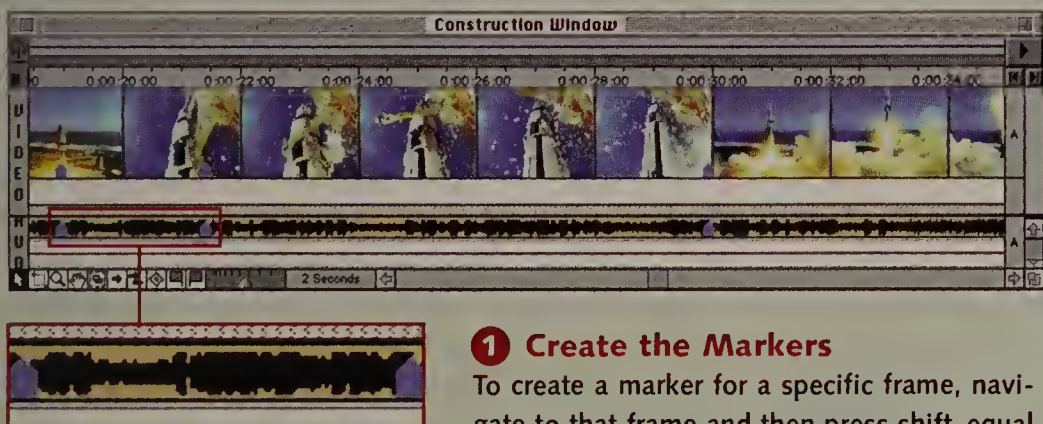
Once you've encoded your movies, you need to serve them to your visitors. You can serve RealVideo files in two ways.  
*continues*

## Encoding RealVideo in Adobe Premiere

RealNetworks' Adobe Premiere export plug-in gives you more control than RealEncoder over which frames are encoded. Most of the plug-in's settings are identical to their counterparts in RealEncoder. The difference is in the plug-in's Marker Options area, which has buttons that let you take advantage of Premiere's markers feature. Markers are electronic bookmarks within clips;

they let you quickly locate a particular section of a clip or align clips.

In RealVideo, markers also let you control which frames of the movie are encoded. Usually, some frames in a movie are more important than others. By marking these frames and choosing the right settings in the export plug-in, you ensure that the most-important frames will be encoded.



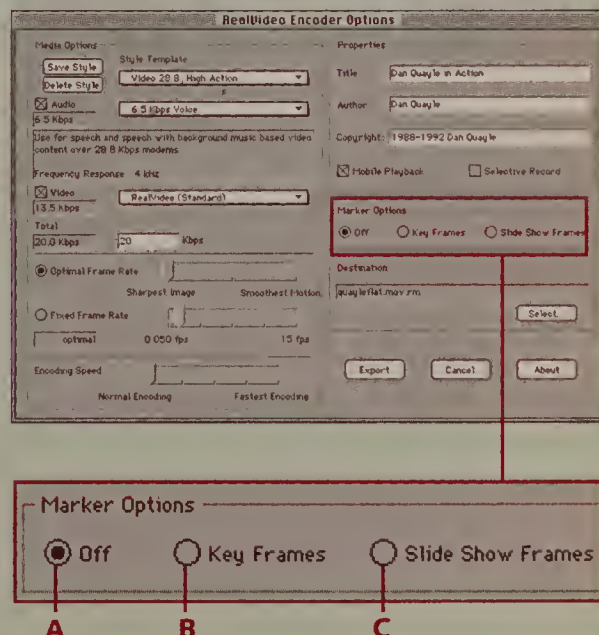
### 1 Create the Markers

To create a marker for a specific frame, navigate to that frame and then press shift-equal sign (=).

**TIP** You can make a slide show and save bandwidth. Here's how: Say you have a video clip containing landscape scenes—a meadow, a flower close-up, a lake—and it also contains a soundtrack with music and narration. Encode it normally—let the encoder plug-in choose which frames to discard in order to meet your chosen bandwidth—and you'll get a RealVideo movie containing multiple frames where nothing really changes, except maybe a few ripples in the lake. If you create one marker for each scene and encode the clip with the Slide Show Frames option selected, the resulting RealVideo clip will contain one frame per scene, with plenty of bandwidth left over for a great-sounding soundtrack.

### 2 Specify Marker Options

To encode the movie and set marker options, choose RealEncoder from the File menu's Export submenu.



**A** The export plug-in ignores markers when encoding.

**B** The plug-in encodes every frame that has a marker (it may include other frames, depending on which encoding settings you select).

**C** The plug-in encodes only the frames that have markers.

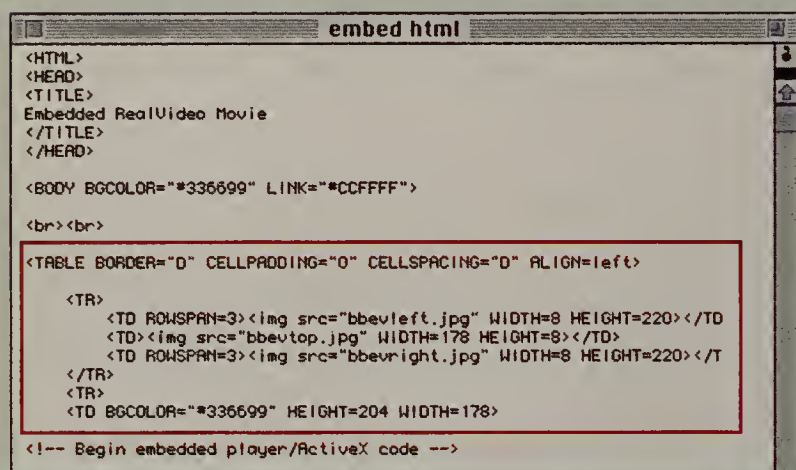


## HTML for Video

Once you've encoded your movie, you're ready to make it available to your site's visitors. Upload it to your Web server as you would an HTML page or graphic, and then create the appropriate HTML as described here.

**Create the Metafile** As with RealAudio, you can't simply refer to a RealVideo clip in a link—doing so would cause the RealPlayer software to download the entire clip before playing back. Instead, you must create a metafile, a one-line text file that references the RealVideo .RM file—for example, [http://www.your\\_domain.com/liftoff.rm](http://www.your_domain.com/liftoff.rm) (if you're using RealNetworks' server software instead of HTTP streaming, use `pnm:` as the locator instead of `http:`).

**Referencing the Clip** You can use conventional hyperlinks to reference the metafile's clip, or you can embed it directly within the page. Hyperlinks are easier—just use the `<HREF>` tag to reference the metafile. But embedding enables you to create a custom interface for the clip, such as the one shown at the top right.



An HTML table (highlighted) positions the bevel-edge graphics as a frame. Not shown here are lines of code you need for embedding the clip in your page. To see the entire HTML source for this page, go to [www.macworld.com/more/](http://www.macworld.com/more/).



Embedded clips can have custom frames.



The clip's beveled edges are four separate JPEG graphics; the title is a graphic too.

The preferred way is to use RealNetworks' server software—it transfers data using the *User Datagram Protocol* (UDP), which helps ensure more-reliable playback and lets visitors drag a slider to jump around in a movie.

The second way is to use the same HTTP server software that's dishing out your Web pages. If you're running your own server now, you can use the same box to spew video streams. If a service provider or online service hosts your pages, you can simply upload video clips in the same basic way that you upload graphics and HTML files (although with RealVideo, you must also create a metafile—see "HTML for Video").

But HTTP streaming isn't as reliable as UDP streaming and doesn't use network bandwidth as efficiently. And from a viewer's standpoint, HTTP streaming doesn't permit the same degree of random-access flexibility. For example, viewers can jump forward to a spot located five minutes into a RealVideo movie, but they may have to wait until everything up

to that point has been downloaded before playback resumes. UDP streaming doesn't have this limitation.

The decision to use RealNetworks' server software or conventional server software used to be one of economics: RealNetworks' server software started at about \$1,000. That changed with the arrival of the free Basic Server. It serves RealAudio and RealVideo clips to as many as 60 visitors at once (depending on your Internet connection's speed—60 simultaneous streams consume roughly half of a T1 line's capacity; a dual-channel ISDN line handles about 12).

Like other RealNetworks' server software, Basic Server is available for Windows 95, NT, and various flavors of Unix. It isn't available for the Mac OS, but RealNetworks says it may develop servers for Apple's forthcoming Rhapsody OS. Many Internet service providers offer hosting services for RealNetworks' server software; check out RealNetworks' Web site ([www.real.com](http://www.real.com)) for details.

VivoActive relies on HTTP streaming exclusively. One side effect of this is that the VivoActive plug-in and player do not provide random-access features: playback controls are limited to play and pause buttons. But on the plus side, VivoActive image quality is excellent. And the VivoActive plug-in and player download the video clips in a way that uses network bandwidth more efficiently than does RealVideo HTTP streaming.

### You Too Can Be a Broadcaster

Streaming video is another example of how the Web democratizes broadcasting. Sure, it's useful for CNN Interactive and for companies offering training videos on intranets, but it's also useful for video hobbyists, independent filmmakers, and proud parents. RealNetworks deserves much of the credit, giving away its top-notch encoder and enabling the delivery of RealVideo with standard HTTP servers. **m**

JIM HEID's latest book is *HTML & Web Publishing Secrets* (IDG Books Worldwide, 1997).



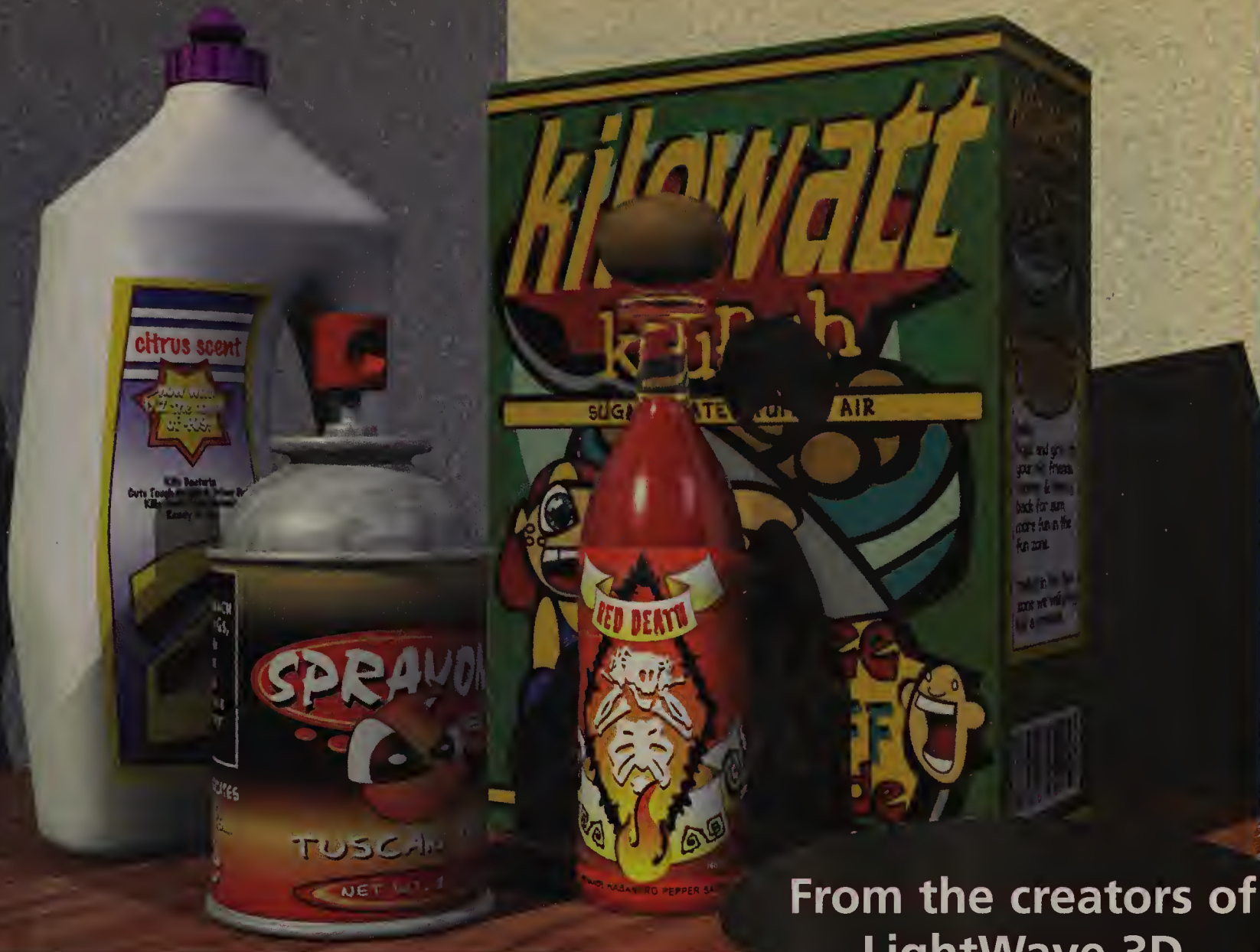


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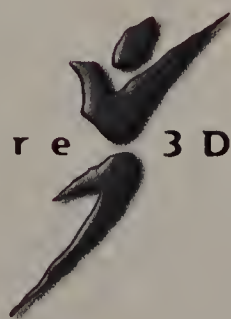
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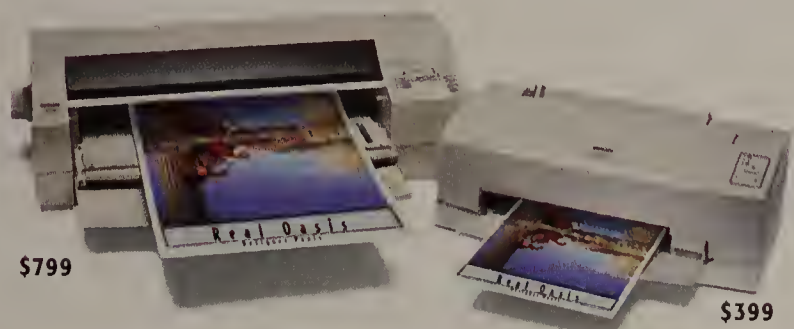
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## Distorted Reality—the Magic of Displacement Mapping

Realistic Distortion Using Photoshop and After Effects

by David Biedny and Nathan Moody

**W**hen our friends at Pull Down Your Pants Productions (founded by three very talented ex-Industrial Light & Magic folks) asked us to contribute visual effects for their motion picture debut, *Spawn*, we started mentally preparing our arsenal of distortion effects. A specific technique immediately came to mind for many of the effects we needed to create: *displacement mapping*. If you watch movies or TV, you're familiar with displacement maps, whether you know it or not. They appear in a wide range of special effects, from the subtle and realistic (such as warping a texture or shadow to follow the contours of an object onto which it's composited) to the extreme and fantastic (making reality bubble and seethe before your eyes).

Many people—including seasoned imaging professionals—don't realize that displacement maps can create stunning

still-image effects too. In fact, it's easier to grasp the way displacement maps work if you start with still images in a program like Adobe Photoshop. You can then build on your knowledge to do even more complex effects in moving pictures with something like Adobe After Effects.

### Displacement Basics

First, let's review the essential concept behind image displacement. Displacement mapping uses the brightness values of pixels in one image (the displacement map) to move pixels in another image (the target). Map pixels that are 100 percent white move the corresponding target pixels a user-specified amount in one direction (the positive offset), while map pixels that are 100 percent black move target pixels the same amount, but in the opposite direction (the negative offset).

Map pixels that are 50 percent gray produce no offset, while pixels in other shades of gray produce offsets that are

smaller than the user-specified amount. Positive offset values usually represent movement left and up; negative values usually represent movement right and down. (The whole concept is a lot easier to understand with visual aids, so check out "The Basics").

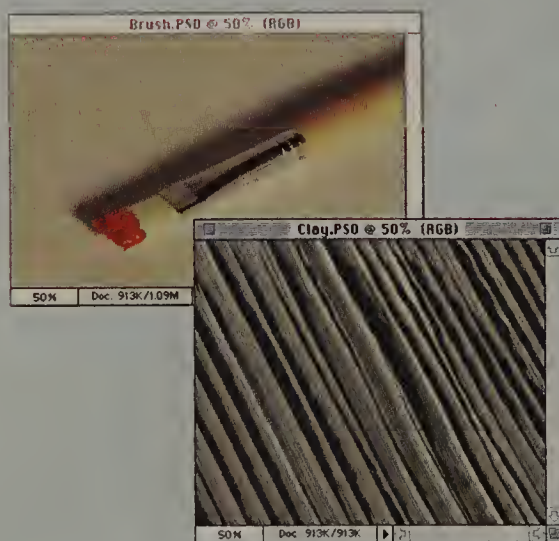
The beauty of this technique is that it lets you warp images with a high degree of control. You can use gradients to shift pixels gradually so that an image appears to stretch, and you can use curves to make an image seem to sag in the middle. In effect, you can turn any image into a mold and drape a second image over it.



The happy couple on the left is our target, the image to be displaced. The gradient on the right is the displacement map, whose brightness will be used to offset the pixels in the target.

## Map Your Way to Realistic Shadows

How can displacement mapping be used to address a real-world Photoshop problem? If you do image compositing and have never used displacement mapping to process synthetic shadows, you'll be pleasantly surprised by the results. Here's an example of how the Displace filter can be used to enhance the realism of an otherwise flat drop shadow.



We can create a composite image of a brush against a background of clay from these two files.



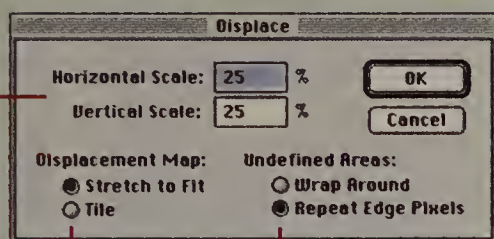
We masked the brush, selected it, and placed it into the clay image, on a separate layer. A few simple modifications help make the lighting of the brush and the background match. Matching apparent lighting and brightness is crucial in compositing!

Darkening the clay background in the upper right-hand corner better simulates realistic lighting. Flipping the brush horizontally and repositioning it better matches the lighting of the background layer.



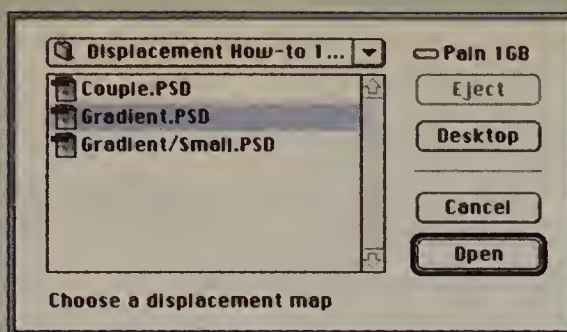
The Displace filter's dialog box governs all aspects of the distortion effect.

Moves pixels horizontally (positive = left, negative = right) and vertically (positive = up, negative = down)

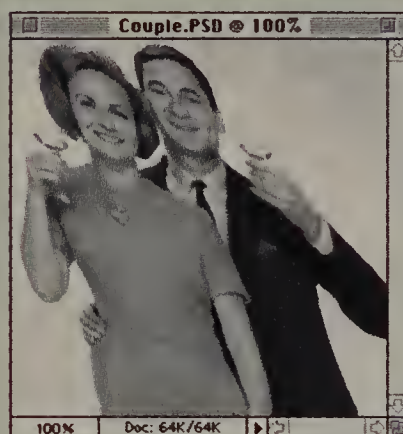


Scales map up or down to match target (top) or fills empty area by repeating map as a tiled pattern (bottom)

Wraps target's displaced edges around image (top) or repeats target's original edge pixels (bottom)



After determining the displacement settings, Photoshop asks you to designate the displacement map file you'd like to use.



Here's the result. Notice how the bright top region of the displacement map has shifted the target pixels up and to the left, while the dark lower region has shifted the target pixels down and to the right. The amount of offset falls off toward the middle of the displacement map, as the gradient approaches 50 percent gray.

## Displacement Maps in Photoshop

Various applications offer displacement mapping; two common ones are Photoshop and After Effects. (Higher-end 3-D software packages offer related, but different, displacement functions.) Although the basic concepts are the same no matter where you use them, the specifics vary for different programs. Here are some things to keep in mind when using Photoshop's Displace filter.

• **Color mode is important in Photoshop displacement mapping.** The target image and the displacement map can be in any color mode except Bitmap, but one

mode—CMYK—works differently from the rest. If the target is a CMYK image, the displacement results are the opposite of what we described above. That is, white pixels in the map move CMYK target pixels up and to the right; black map pixels move them down and to the left.

• **Channels control displacement.** Photoshop's Displace filter takes into account the number of channels in the displacement map. In a single-channel document the brightness values displace target pixels both horizontally and vertically; in a multichannel document, however, the brightness values in the first channel dis-

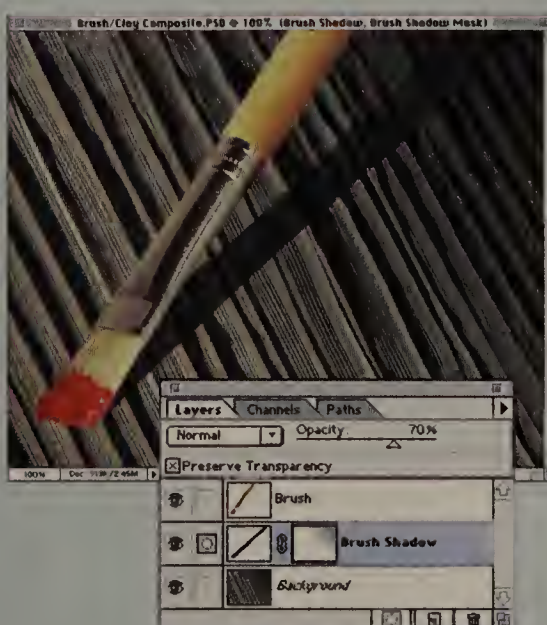
place target pixels horizontally, while brightness values in the second channel displace target pixels vertically. Displacing with an RGB map, for example, results in the Red channel's creating the horizontal offset and the Green channel's creating the vertical offset. (Unless you explicitly plan for this, converting color images to gray scale may yield more predictable results.)

• **Photoshop calculates displacement as a percentage.** The offset values are expressed as percentages, based on a maximum offset of 128 pixels. For example, a black displacement map with an off-

*continues*



To create the shadow, we duplicated the brush layer, filled it with black, and moved it to the right. We repositioned the shadow layer underneath the original brush layer.



Before applying the displacement map, we rotated and repositioned the shadow to make the brush look as if it's at more of an angle to the background. We added a layer mask to decrease the shadow's opacity as it gets farther from the tip. But as you can see, the shadow still doesn't conform to the physical contours of the background, as it would in real life. That's where displacement mapping can help.

*continues*



## After Effects: Displacement over Time

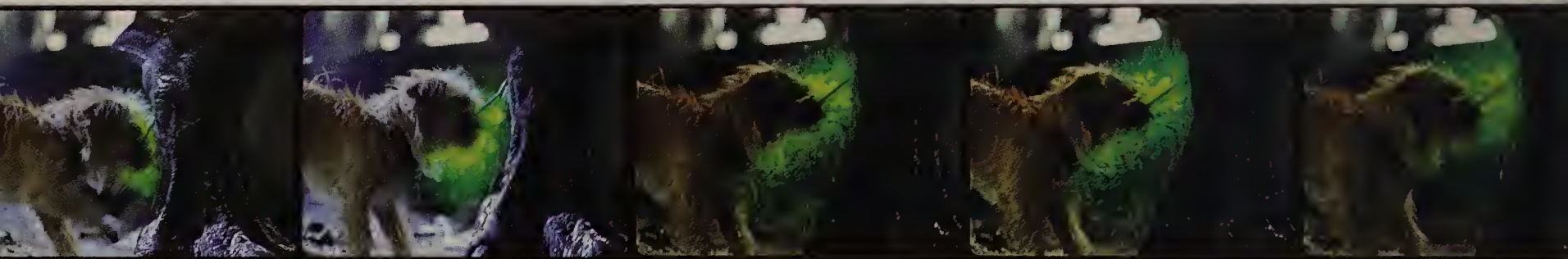
PHOTOSHOP ISN'T THE ONLY PLAYER in town when it comes to displacement mapping. In fact, After Effect's displacement effects can create even more visual mayhem by animating distortion effects over time. In contributing visual effects for the movie *Spawn*, one of our tasks was to generate a vapor that escapes a wounded creature's body. Our tool of choice—After Effects—doesn't exactly have a Monster Wound Vapor filter, but we found a way to create the effect we wanted using particle systems and some creative displacement mapping.

The first step of the solution seemed fairly obvious: start with a particle system, usually a good way to simulate vapors and gases in special effects. We chose the FE Particle effect from the Final Effects plug-in suite (from MetaCreations). The results, unfortunately, were not chaotic enough, with the particles traveling in a fairly linear fashion. How were we to get these particles to flow naturally, to introduce some realistic entropy?

We immediately thought of displacement mapping. Since the effect was animated, it didn't make sense to displace an animated particle stream with a still image—it would look as if the particles were flowing around a static, unseen object. But what would happen if we displaced one particle stream with a second one?

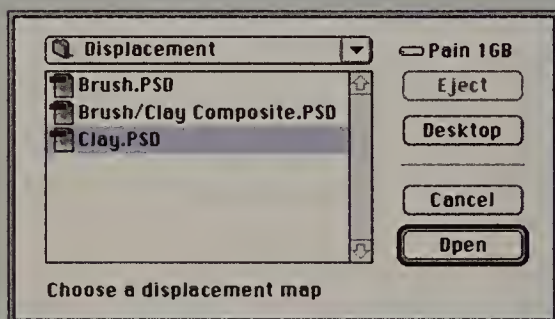
We placed a new particle system in its own composition and gave it larger particle shapes (Faded Spheres, in this case). Then it was time to try using this particle system as the displacement for the first system. After Effects needs rendered pixels to displace other layers; that means algorithmic effects such as particles must be prerendered (and imported as a QuickTime movie or PICT sequence) or placed in nested compositions for displacement mapping to work. Rather than render out the entire particle system beforehand, we simply placed it in a nested composition.

This technique wound up being the basis for many of our effects in *Spawn*. We displaced generic lightning arcs to create unique bubbling, weaving energy bolts. By displacing simple glows we were able to form rippling, moving auras. Static fields of bubbles were displaced to create ebbing clouds of vapor. But these possibilities are only the tip of the iceberg. What might happen if you have more than one displacement effect on a single layer? What if a particle system was displacing only someone's face as he or she spoke a line of dialogue? What if a displacement effect was used (in conjunction with traveling mattes and alpha channels) as the basis of a transition? There's really no limit to the creative potential of animated displacement mapping.

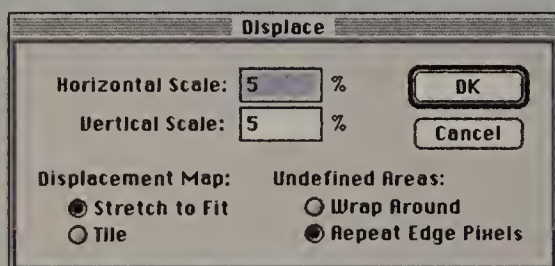


We were able to transform a simple particle stream into a gaseous animated effect, thanks to After Effects' Displacement Map effect and MetaCreations' Final Effects particle system plug-ins.

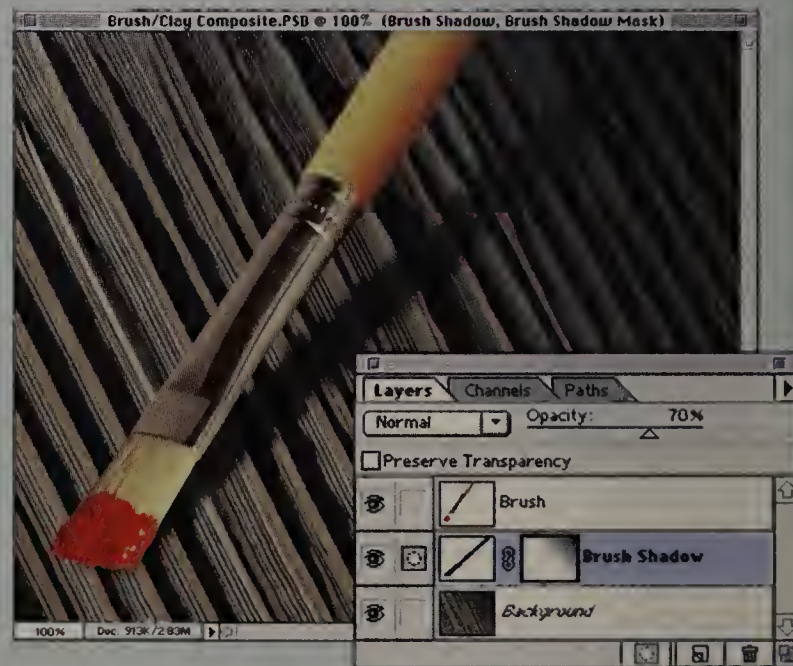
*"Map Your Way to Realistic Shadows," continued*



Using the original background file as a displacement map, we set the Displace filter for a 5 percent horizontal and vertical offset. The Brush Shadow is the target layer.



**TIP** It's usually better to displace a shadow before adding blurring or other effects. Otherwise, a harsh edge in a displacement map might suddenly offset a blurred edge and detract from the effect's realism.



The resulting displacement, slightly blurred for realism, seems to make the shadow conform to the dimensional bumpiness of the background image.



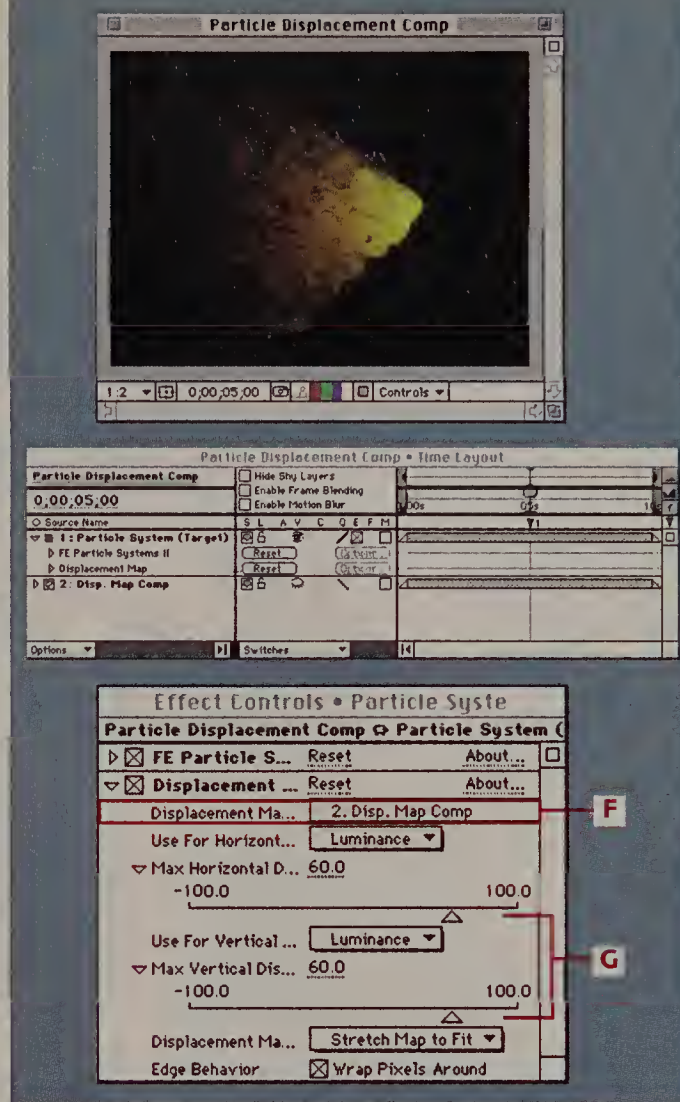
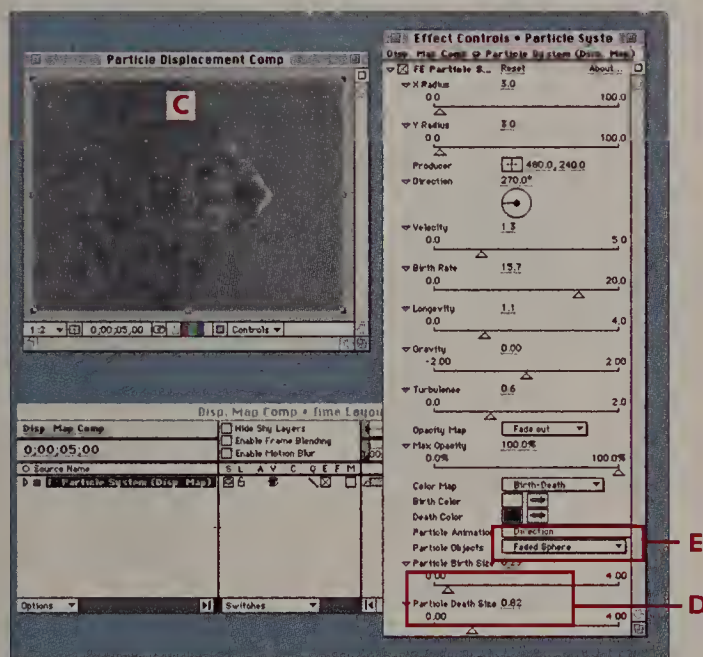
## Step 1

In our first attempt at creating an unearthly gaseous vapor, we tried MetaCreations' FE Particle filter. The result is an animated, but primarily linear, effect. The particles radiate from the emission point (A) but never deviate from their initial trajectory as they fade out (B). We wanted something with chaotic motion and character.



## Step 2

We created a second particle system, with a wider spread (C), larger particles (D), and different particle objects (E). The background is 50 percent gray, to ensure no displacement of other elements.



## The Result

With the nested composition as a displacement map (F), the particle system target gets distorted in a very fluid way. The relatively high displacement settings (G) create a more obvious turbulence. (Note that a displacement map doesn't need to be, and often shouldn't be, visible when you create your effect, but it must be included in your current composition.)

set of 50 percent would move a target pixel 64 pixels down and to the right.

• **Mismatched map and target sizes can create problems.** Having displacement maps that are the same size as your target will yield the smoothest, most accurate results. If the two images are different sizes, Photoshop must deal with the discrepancy somehow. You can specify that Photoshop scale the map image to match the target image (this throws off the percentage of displacement that you specify), or you can have Photoshop use the map image as a tile, repeating the image to fill up the extra space (this makes it even harder to predict your results).

## Displacement in After Effects

After Effects adds a few twists to displacement mapping: animation (using a movie file as the displacement map) and

interpolating effects over time (animating the behavior and positions of both the displacement map and the image being displaced). Here are some key issues to be aware of when you plan an After Effects displacement effect.

• **Pixel offsets work the same as in Photoshop.** In After Effects, white offsets pixels by the user-specified amount, black moves them the opposite direction, and 50 percent gray has no effect.

• **You specify offset in pixels.** This is a more accurate way to gauge potential distortions than Photoshop's percentage-based settings, and the maximum possible offset is 32,000 pixels.

• **After Effects has more precise controls than Photoshop.** After Effects can use the luminance of a layer's red, green, blue, or composite color channel as a displacement map. Horizontal and vertical

displacement maps can be specified independently; you're not tied to an image's first two channels as in Photoshop.

Whether it's in Photoshop or After Effects, displacement mapping is an incredibly versatile distortion effect that can range from subtle and simple to over-the-top and complex, depending on how it's used. Used properly and with some restraint, it's stunning on still images and mind-blowing when animated. The Hollywood special-effects community has been quietly using this amazing technique for years; the power is now in your hands as well. **m**

DAVID BIEDNY and NATHAN MOODY recently coauthored (with Bert Monroy) *Photoshop Channel Chops* (New Riders Publishing, 1998). They also created a variety of digital special effects for New Line Cinema's motion picture *Spawn*.





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#### GS771 17" Display Short Depth Design

- 16.0" viewable
- 1280 x 1024 max. resolution
- .27mm dot pitch
- 14" footprint

**\$499.99** #25520

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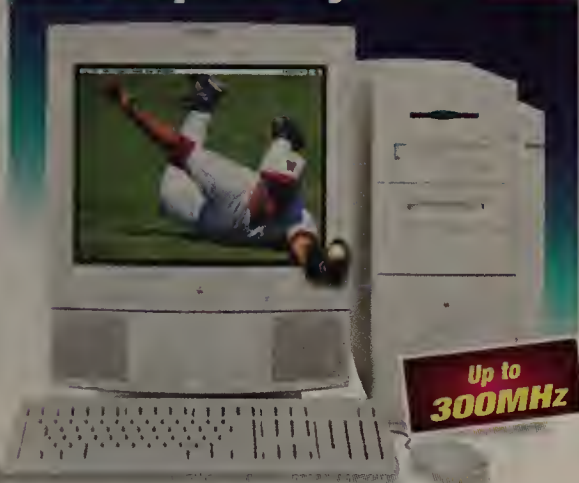
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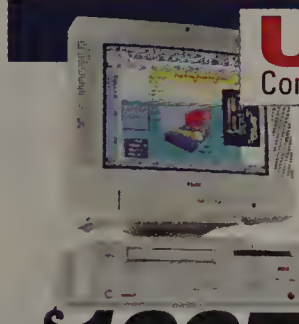


**Power Macintosh® 8600 & 9600**

#27117	Power Macintosh 8600/300MHz/604e/32MB RAM/4GB HD 24X CD-ROM/Zip Drive	\$3,099
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Monitor sold separately on all models.

**UMAX**  
Computer Corporation



**SuperMac C500/200MHz**  
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16MB RAM/2.1GB HD  
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**\$1095!**

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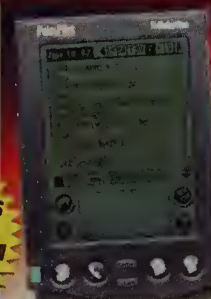
**SONY 100sx Color Display**

- ▶ 15" Color display
- ▶ 1280 X 1024 max. res.
- ▶ .25mm dot pitch

**\$249<sup>99</sup>**

#23973 (factory refurbished)

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**PalmPilot Professional Edition w/1MB RAM**

- ▶ 5.7 oz and 4.7" long
- ▶ Includes: Date Book, Address Book, To Do List, Memo Pad, Security, Games and Hot Sync

**for only \$344<sup>99</sup>**

#15244 3Com Palm Pilot

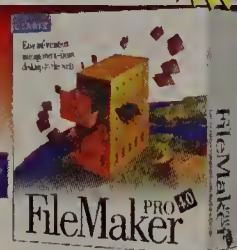
**FileMaker Pro 4.0**

- ▶ Powerful data management
- ▶ Built-in CGI tools

**\$89<sup>99</sup>**

#14843 (upgrade)

CLARIS



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Together For Only

**\$59<sup>99</sup>**

#24627

\*After '20 Quicken Deluxe Mfr. mail-in rebate for previous Quicken users and '15 MacInTax Deluxe mail-in rebate, plus additional '15 rebate for bundle purchase.



**Microsoft Office 98**

Mac upgrade only

**\$268<sup>99</sup>**

#26155

**Microsoft**



**Stylus Color Pro Printer**

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- ▶ Optional PostScript
- ▶ Factory refurbished

**\$189<sup>99</sup>**

#96717



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#95195

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# NEW! Apple Power Mac



## Apple PowerBooks AS LOW AS

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Price for PowerBook 1400CS/166MHz—Item# CPU0990, see below.  
Shown is PowerBook 3400c/240MHz.

**PowerBook 1400CS/166MHz/16MB RAM 1.3GB HD/  
12X CD-ROM/11.3"/Dual-Scan display. While supplies last.  
CPU0990 was \$2200 ..... \$1749**

**PowerBook  
1400C/166MHz/16MB RAM  
2.0GB HD/8X CD-ROM/11.3"/  
Active-Matrix display.  
CPU0745 was \$2000 ..... \$1999**

**PowerBook 2400C/180MHz  
16MB RAM/1.3GB HD/  
10.4" Active-Matrix display.  
CPU0713 was \$2400 ..... \$1999**

**PowerBook  
3400C/240MHz/16MB RAM  
3.0GB HD/33.6K modem/  
10Base-T Ethernet/12XCD  
CPU0610 ..... \$4499**

**UP TO  
240MHz!**

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GUARANTEE**

**30-DAY  
Guarantee  
Against Defects**



## 20th Anniversary Mac

### Limited Edition Features:

- Dynamic Bose Acoustimass sound system
- Built-in Apple TV/FM Radio System
- 12.1" TFT active matrix color display

*This ultra-slim design is as innovative as the first Macintosh 20 years ago!*



**New!**

250MHz PowerPC 603e processor/32MB RAM/  
2.0GB HD/CD, Ask for item# CPU1011 ..... **\$3999**



**PRICES  
SLASHED!**

Power Mac  
6500/275MHz shown.  
Monitor sold separately.



## Apple Power Mac 6500

**\$1299!**

AS  
LOW  
AS

**WHILE SUPPLIES LAST!**

**Power Mac 6500/225MHz: 32MB RAM/3GB HD/12X CD/  
33.6K Modem. CPU0625 was \$1699 While Supplies last!.. \$1299\***

**Power Mac 6500/250MHz: 32MB RAM/4GB HD/24X CD/  
56.6K Modem. CPU0862 was \$1499 ..... \$1499**

**Power Mac 6500/275MHz: 32MB RAM/6GB HD/24X CD/  
56.6K Modem/ZIP Drive. CPU0864 was \$2499 ..... \$1799**

**Power Mac 6500/275MHz: 48MB RAM/6GB HD/24X CD/  
56.6K Modem/ZIP Drive. CPU0863 was \$2799 ..... \$2099**

**Power Mac 6500/300MHz: 64MB RAM/6GB HD/24X CD/  
56.6K Modem/ZIP Drive. CPU0865 was \$2999 ..... \$2299**



## Power Mac 8600/9600

- 250-350MHz PowerPC 604e processor
- 32MB-64MB RAM (exp to 512-768MB)
- 4.0GB hard drive
- 24X CD-ROM drive
- 2MB-8MB VRAM
- 100MB Zip drive

**UP TO 350MHz!**

Monitor sold  
separately.

Power Mac 8500/250MHz shown.



**Power Mac 8600/250MHz  
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**Power Mac 8600/300MHz  
32MB/4GB/24X CD/Zip Drive. CPU0784 While supplies last! .... \$3099**

**Power Mac 9600/300MHz  
64MB/4GB/24X CD/Zip Drive. CPU0785 ..... NOW ONLY! \$3499**

**Power Mac 9600/350MHz  
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**Epson Stylus Color 600 Printer**

ONLY **\$249!**  
Was \$369!

Stylus Color 800 Printer (shown) Item # PR12127  
ONLY \$349

- 1440 x 720 dpi
- Up to 7ppm color

Item# PR12126

**Canon BJC-4550 Color Printer**

ONLY **\$299<sup>95</sup>!**

- Prints on paper up to 11" x 17"
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- 5ppm black/1ppm color
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Adobe PhotoDeluxe and Presto! PageManager software.

- 30-bit single-pass color CCD
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Item # DRI 1050

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\$19.95ea	\$16.95ea	\$12.99ea	

\*Disk Includes Zip Tools Software

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16MB upgrade for G3 PowerBook.  
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# G3 Series!

Get a Furiously-Fast G3

For As Low As **\$1999!**



Price for Power Mac G3 Desktop/233MHz—Item# CPU0956, see below.  
Shown at right is Power Mac G3 Mini-tower/266MHz, only \$2999.

Hottest-selling Mac Ever!



Monitor sold separately.



Model shown is Power Mac G3/266MHz w/ZIP. Monitor sold separately.

UP TO **266MHz!**

## The New Power Mac G3 Mini-tower Systems Feature:

- 233MHz or 266MHz PowerPC G3 processor
- 512K Level-2 backside cache
- 32MB-128MB RAM (expandable to 384MB)

Power Mac G3 Mini-tower/233MHz/32MB RAM/  
4.0GB HD/24X CD/56K Modem: Item# CPU1105

Power Mac G3 Mini-tower/266MHz/32MB RAM/  
6.0GB HD/24X CD/ZIP Drive: Item# CPU0958 **\$2999**

Power Mac G3 Mini-tower/266MHz/128MB RAM/4.0GB HD/  
Ultra-wide SCSI HD/24X CD/100Base-T Ethernet: Item# CPU1104 **\$4199**

## Apple Power Mac G3 Desktop Systems

- 233 or 266MHz PowerPC G3 Processor
- 512K Level-2 Backside Cache
- 32MB RAM (exp to 192MB)
- Built-in 10Base-T Ethernet

Power Mac G3 Desktop/233MHz/32MB RAM/  
4.0GB HD/24X CD: Item# CPU0956 **\$1999**

Power Mac G3 Desktop/266MHz/32MB RAM/  
4.0GB HD/24X CD/ZIP Drive: Item# CPU0957 **\$2399**

## New! Apple PowerBook G3

The FASTEST Notebook on the PLANET!

- 250MHz PowerPC G3 Processor
- 512K Level-2 Backside Cache
- 32MB RAM
- 5.0GB Hard Drive
- 20X CD-ROM Drive
- 33.6K Modem
- 12.1" Active-matrix display



Item# CPU0961 **\$5699**



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Upgrade **\$69.95!**

Item# SYS0280

\*Price reflects publisher's \$30 mail-in upgrade rebate for previous owners of Mac OS 7.6. Proof of ownership of Mac OS 7.6 purchased separately or acquired through CPU purchase required.



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- Character-based style sheets
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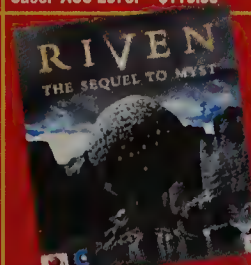
## Olympus D-320L High-Resolution Digital Camera

- Resolutions up to 1024 x 768
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Accessories Kit includes:  
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1-4 5-9 10+

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MACWORLD April 1999



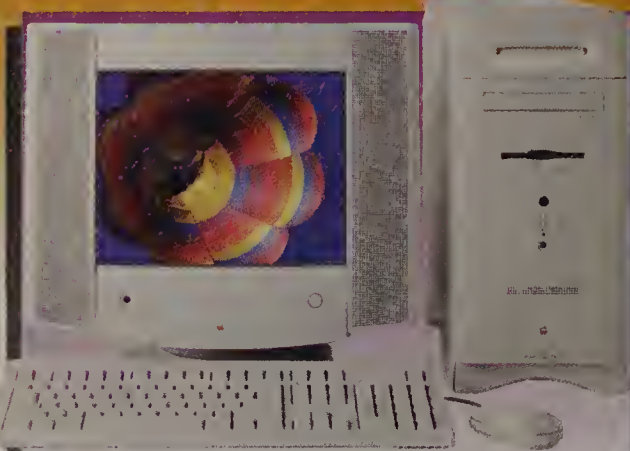


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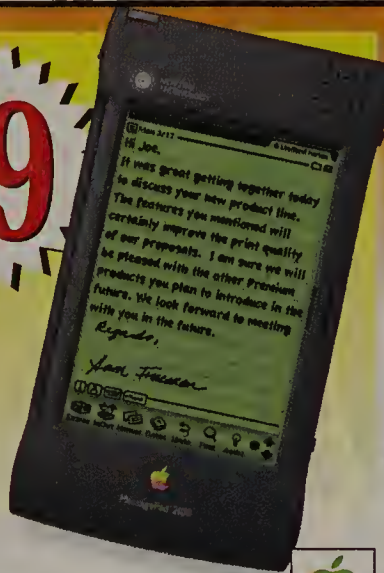
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**NEW!**

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### PowerBook G3/250

- 250MHz PowerPC G3 processor
- 32MB RAM (160MB max)
- 5GB Hard Drive
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- 512K L2 Backside Cache

48162 Apple PowerBook G3/250 ..... \$5699  
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35928 G3 PowerBook AC Adapter ..... 49.95

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**G3**  
**"The Fastest Laptop Yet!"**  
-Macworld 1/98



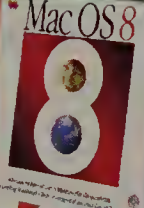
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- 512K Backside Cache
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**Designed for Mac OS 8!**



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**G3 Power at an Incredible Price!**

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- 66MHz System Bus

48158 **ONLY**

**\$1999**

48159 Power Mac G3/266..... \$2399  
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40682	Norton Utilities Mac	97.95
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43868	Adobe Photoshop 4 Mac	539.95
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9.1GB Cheetah	ST19101N	8ms	10000	\$1029	\$1079
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4.5GB Cheetah	ST34501W	8ms	10000	\$699	\$779
9.1GB Barracuda 9	ST19171W	8ms	7200	\$829	\$909
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Apple Quadra 700	4	68	256k	34			48					104					356	
Apple Quadra 800 (pairs)	8	136	512k	59			15		34			49			99			
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Power Macintosh 8100/80AV, /100AV, /110AV (pairs)	8/16	264	512k	59	29/109		15		34			49			99			
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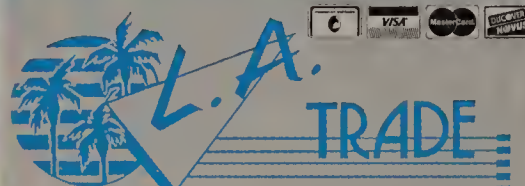
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64MB	64764SD	\$219	64MB	64764	\$152	32MB	32764EDO3.3V	\$80	32MB	32764EDO5V	\$80	16MB	16732	\$43	8MB	8888	\$42
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Module	Item#	Price	Module	Item#	Price	Module	Item#	Price	Module	Item#	Price	Module	Item#	Price	Module	Item#	Price
128MB	PB3400-128G3	\$425	128MB	PB3400-128	\$439	64MB	PB2400-64	\$382	48MB	PB2300-48	\$288	36MB	PBDUO-36	\$142	32MB	PB190-32	\$155
64MB	PB3400-64G3	\$230	96MB	PB3400-96	\$399	32MB	PB2400-32	\$186	36MB	PB2300-36	\$245	28MB	PBDUO-28	\$239	16MB	PB190-16	\$116
32MB	PB3400-32G3	\$119	64MB	PB3400-64	\$236	24MB	PB2400-16	\$153	32MB	PB2300-20	\$205	20MB	PBDUO-20	\$139	12MB	PB190-12	\$70
16MB	PB3400-16G3	\$78	32MB	PB3400-32	\$119	16MB	PB2400-8	\$93	20MB	PB2300-16	\$162	14MB	PBDUO-14	\$115	8MB	PB190-8	\$65
			24MB	PB3400-24	\$145				16MB	PB2300-16	\$118	12MB	PBDUO-12	\$109			

POWERBOOK 5300			POWERBOOK 1400			POWERBOOK 500			POWERBOOK 150		
Module	Item#	Price	Module	Item#	Price	Module	Item#	Price	Module	Item#	Price
48MB	PB5300-48	\$205	24MB	PB1400-24	\$117	32MB	PB500-32	\$88	28MB	PB150-28	\$219
32MB	PB5300-32	\$95	16MB	PB1400-16	\$89	16MB	PB500-16	\$49	20MB	PB150-20	\$160
16MB	PB5300-16	\$77	8MB	PB1400-8	\$60	8MB	PB500-8	\$45	8MB	PB150-8	\$70
8MB	PB5300-8	\$65				4MB	PB500-4	\$40	4MB	PB150-4	\$45

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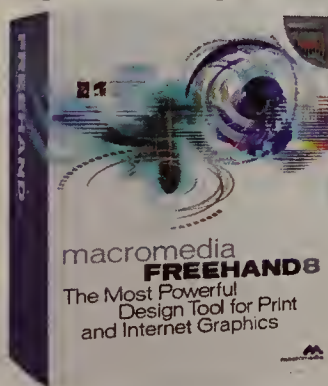
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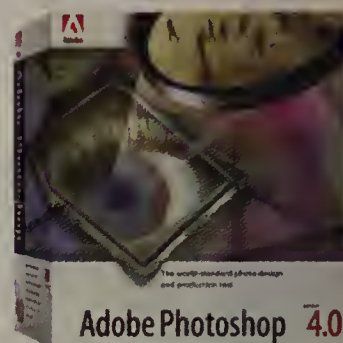


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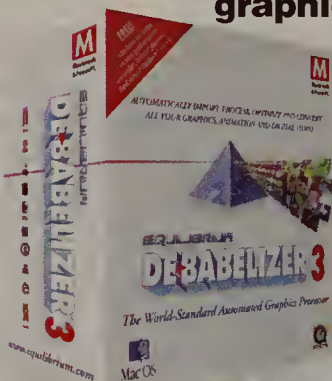


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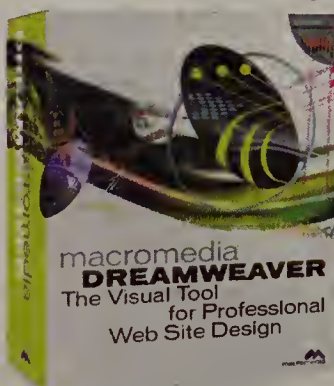
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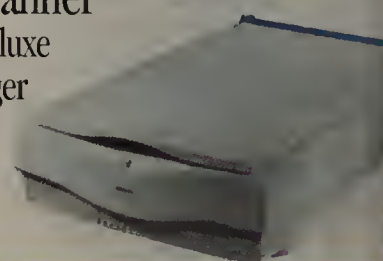
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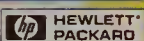
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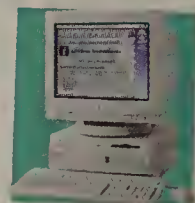


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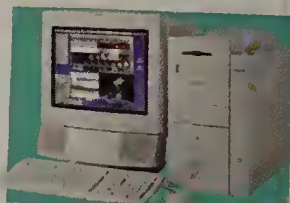
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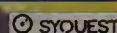
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Xclaim TV external TV tuner	79.79
Xclaim 3D 4MB PCI	177.03
Xclaim 3D 8MB PCI	229.32
Xclaim VR 4MB PCI	248.02

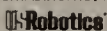
## Communications



Megahertz 33.6 Ethernet 10BT	
PC Card w/RJ11	299.64
Courier I-modem	339.78



TelePort 56K x2 external	155.49
TelePort 56K K56flex external	149.33
TelePort 56K PLUS Mac QS 8	
K56flex external	174.98
TelePort 56K PLUS Mac OS 8	
x2 external	174.98
56K bps fax/modem PC Card	249.34
56K bps fax/modem/Ethernet PC Card	348.50



Sportster 56K x2 faxmodem external	179.13
Sportster 33.6 external	119.17

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- ◆ HP C3094A

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CDW 97680

## Data Storage



Hi-Val SounTastic 16X CD Kit w/software external	219.29
Hi-Val SounTastic 24X CD Kit external	179.91
Hi-Val SounTastic 2X6 CD-Recording system external	389.59

## iomega

Zip drive 100MB external	139.95
ZipPlus 100MB external	199.95
100MB Zip disk 3-pack	49.95
Jaz drive 1GB external	399.95
Jaz drive 2GB internal	549.95
Jaz drive 2GB external	649.95
1GB Jaz disk 3-pack	299.95

## LACIE

2.1GB Quantum ST Ultra SCSI-3 internal	259.00
3.2GB Quantum ST Ultra SCSI-3 internal	299.00
4.3GB Quantum ST Ultra SCSI-3 internal	359.00
6.4GB Quantum ST Ultra SCSI-3 internal	469.00
9.1GB Quantum Ultra SCSI-3 internal	829.00
2GB Apple drive Ultra SCSI-3 external	389.00
3GB Apple drive Ultra SCSI-3 external	429.00
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2.1GB Fireball SE Ultra SCSI-3	219.16
3.2GB Fireball SE Ultra SCSI-3	265.62
4.3GB Fireball SE Ultra SCSI-3	299.02
6.4GB Fireball SE Ultra SCSI-3	389.65
8.4GB Fireball SE Ultra SCSI-3	507.77

## SyQuest®

SyJet 1.5GB SCSI external	299.99
SyJet 1.5GB cartridge	79.99

## Scanners

### AGFA

SnapScan flatbed scanner	379.63
SnapScan 310 flatbed scanner	199.83
SnapScan 600 Art Line flatbed scanner	537.80

### EPSON®

Action Scanning System II	279.88
Expression 636 Executive scanner	799.00
Expression 636 Artist scanner	999.00
Expression 636 Professional scanner	1399.00
Expression 836XL scanner	2499.00



HP ScanJet 6100cse flatbed scanner	799.00
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### MICROTEK

ScanMaker E3 Plus scanner	145.80
ScanMaker V600 scanner	239.63
ScanMaker E6 Standard scanner	285.15
ScanMaker E6 Professional scanner	524.91
ScanMaker 6400XL scanner	926.01

### Nikon

LS-20 Super CoolScan II	909.09
Super CoolScan film scanner	1745.63

### Polaroid

SprintScan 35LE film scanner	796.56
SprintScan 35ES film scanner	1469.51
SprintScan 35+ film scanner	1808.96

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ViewSonic®

Model G790

- ◆ 19" high contrast screen, 18" viewable image size
- ◆ 0.26mm dot pitch
- ◆ Maximum resolution: 1600 x 1280 at 76Hz; 1280 x 1024 at 88Hz
- ◆ 3-year parts, labor and CRT warranty



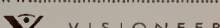
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## Scanners



Astra 610S flatbed scanner	148.87
Astra 1200S flatbed scanner w/full Adobe PhotoDeluxe	239.33
Astra 1200S flatbed scanner w/full Adobe Photoshop	439.34
PowerLook II	1319.32



PaperPort vx scanner	148.57
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## Printers



LaserWriter 8500	2399.29
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### EPSON®

Stylus Color 600	249.00
Stylus Color 800	349.00
Stylus Color 1520	799.00
Stylus Color 3000	1999.00
Stylus Photo	399.00



HP DeskJet 340 portable ink jet printer	266.11
HP DeskJet 870Cxi printer	299.57
HP DeskJet 1600CM printer	1969.33
HP LaserJet 6MP printer	879.85
HP LaserJet 4000se printer	1149.00
HP LaserJet 5Si MX printer	3118.72

## Digital Imaging

### AGFA

ePhoto 307 digital camera	329.67
ePhoto 1280 digital camera	829.97

### EPSON®

PhotoPC 600XGA digital camera	699.00
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DC50 digital camera w/Zoom lens	499.00
DC120 digital camera w/Zoom lens	799.00
DC210 digital camera	899.00

### Nikon

Coolpix 300 digital camera	674.06
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### Panasonic

KXL-600A digital camera	398.79
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### Polaroid

PDC 2000/40 digital camera	1445.40
PDC 2000/60 digital camera	1779.89

## UPS Systems

### APC

PowerChute software for Novell NetWare	59.20
Back-UPS Office	104.76
Back-UPS 200	79.95
Back-UPS 400	129.07
Back-UPS 600	219.95
Smart-UPS 450NET	327.55
Smart-UPS 700NET	406.11
Smart-UPS 1000NET	479.95
Smart-UPS 1400NET	699.98
SurgeArrest P7 Home	9.17
SurgeArrest Personal	19.82
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- Viewsonic 21" P810 monitor
- IMS 8MB PCI video card
- Microtek ScanMaker III/Trans/Photoshop
- GCC 808 800dpi 11x17 Printer & Enet
- SyJet 1.5GB Drive with 1 cartridge
- Wacom 12x12 Graphics Tablet
- Sony SDT-5000 DAT Tape Backup

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- IOmega Zip 100 w/ 1 cart
- Viewsonic EA 771 17" AV monitor
- Scanmaker V310 color scanner
- 6MB Video RAM
- Epson Stylus Color 800 1440dpi Inkjet printer
- Wacom 6x8 Artz Graphics Tablet

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- Apple keyboard
- Int IOmega Zip 100 w/ 1 cart
- Viewsonic EA 771 17" AV monitor
- Scanmaker V310 color scanner
- ATI 4MB PCI 3-D video card
- GCC608 11x17, 600 dpi printer w/ Ethernet connectors
- Wacom 12x12 Graphics Tablet

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- IMS 8MB PCI video card
- TrueVision Targa PCI1000
- Internal 18GB F/W Disk Array with Adaptec SCSI Controller/Remis SW
- Panasonic 4x/8x CDR/1 cart/Toast SW

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- Extended keyboard, Int. Zip Drive
- ViewSonic V95 19" 1600x1200 Monitor
- Radius Thunder 3-D PCI Video
- ScanMaker V310 color scanner
- Strata Studio Pro V2.0 3D Software
- GCC608 11x17, 600 dpi printer w/ Ethernet connectors

### G3 266 TOWER 3-D VIDEO/AUDIO WORKSTATION

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**Only \$8582**

## Lease System Specials

System Description	Price	Lease
PowerBook 1400CS 133/16MB/1.3GB/8xCD	\$1499	\$53
PowerBook 1400C 166/16MB/2GB/6xCD	\$1999	\$69
PowerBook 3400C 200/16MB/2GB/12xCD	\$2599	\$89
PowerBook G3 250/32MB/5GB/20xCD	\$3999	\$137
PowerMac 6500 250/32MB/4GB/24xCD/56k Modem	\$1439	\$51
PowerMac 6500 300/64MB/4GB/12xCD/Zip	\$1759	\$62
PowerMac 7300 180/32MB/2GB/12xCD	\$1199	\$42
PowerMac 7300 200/32MB/2GB/12xCD	\$1399	\$49
PowerMac G3 233/32MB/4GB/24xCD Desktop	\$1639	\$59
PowerMac G3 266/32MB/4GB/24xCD/Zip Desktop	\$1899	\$67
PowerMac G3 266/32MB/4GB/24xCD/Zip/AV Tower	\$2499	\$88
PowerMac 8600 250/32MB/4GB/24xCD/Zip	\$1899	\$69
PowerMac 8600 300/32MB/4GB/24xCD/Zip	\$2199	\$79
PowerMac 9600 300/64MB/4GB/24xCD/Zip/IMS 8MB	\$2699	\$95

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8MB	\$35	\$27	N/A
16MB	\$49	\$45	\$69
32MB	\$79	\$79	\$79
64MB	\$149	\$179	\$249
128MB	\$419	NA	\$509

**JAZ 2GB Ext  
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Carts  
\$79**

## Optical & CDR Drives

- IOmega Jaz 1GB Ext./DG Jaz 1GB Ext \$289/269
- IOmega Jaz2GB Ext., DG Jaz 2gb Ext \$449/429
- Ricoh 2x/2x/6x Rewrite CDR with Toast/cart \$469
- Jaz 1GB & 4x/8x CDR Toast/cart \$829
- Panasonic 4x/8xCDR with Toast/cart \$499

## Optical Cartridges

- 74 MINUTE CD ROM RECORDABLE MEDIA **\$12.99 BOX OF 10**
- OEM 128MB \$6.79
- OEM 230MB \$8.99
- OEM 600/650MB \$24.99
- OEM 1.2/1.3GB \$36.99

## Monitors

Sony 100SE 15", 1280x1024, .25mm	\$337
ViewSonic 15 E655, 1024x768, .28mm	\$278
ViewSonic EA 771AV, 1280x1024, .28mm	\$519
ViewSonic 17GA, 1152x870, .27mm	\$567
Sony 200SX 17", 1024x768, .25mm	\$599
Sony 200SF 17", 1280x1024, .25mm	\$649
Sony 20" ST-300, 1600x1200, .30mm	\$1169
ViewSonic V95 19", 1600x1280, .26mm	\$819
ViewSonic G800 20", 1600x1280, .28mm	\$989
ViewSonic P810 21", 1600x1200, .25mm	\$1189
ViewSonic PT815 21", 1600x1200, .25mm	\$1399
RasterOps MC801HR 21", 1600x1200, .22mm	\$1729
Radius PressView 21SR, 1600x1200, .25mm	\$2985

## SyQuest & ZIP Drives

- ZIP 100 External \$119
- ZIP 100 Plus External \$178
- SyJet 1.5GB External \$229
- SyQuest 200MB External \$379

## Removable Cartridges

- JAZ 2GB \$159
- JAZ 1GB \$79
- Zip 100MB \$11
- SyJet 1.5 \$65
- 200MB \$55
- 88MB \$33
- 44MB \$33

## Tape Drives

- Sony 4GB - 5200 \$769
- Sony 8GB - 7000 \$899
- Sony 8GB - 5000 \$799
- Sony 24GB - 9000 \$1189
- Sony AIT 50GB \$2995

## Scanners

- LinoColor Jade Scanner 33bit \$479
- Agfa SnapScan 310 30bit/Color It \$189
- Agfa Arcus II/Transparency/Photoshop \$1479
- Agfa DuoScan/Transparency/Photoshop \$3299
- Epson Expression 636 Professional/Photoshop \$1379
- Microtek Scanmaker III/Trans/Photoshop \$1379
- Microtek Scanmaker V310 30bit/Color It \$139
- Microtek E6 Pro/ Full Photoshop \$519

## Hard Drives

Description (All SCSI-3 Ultra)	Internal	External
Quantum 2.1GB 5400 rpm Stratus 9ms	\$219	\$279
Quantum 2.2GB 7200 rpm Viking 7.9ms	\$289	\$349
Quantum 3.2GB 5400 rpm Stratus 9ms	\$249	\$309
Quantum 4.3GB 5400 rpm Stratus 9ms	\$289	\$349
Quantum 4.5GB 7200 rpm Viking 7.9ms	\$479	\$539
Quantum 9.1GB 7200 rpm Atlas II 7.9ms	\$769	\$829
Seagate 4.5GB 7200 rpm Barracuda 4.7.9ms	\$569	\$629
Seagate 9GB 7200 rpm Barracuda 9.7.9ms	\$859	\$919
Seagate 4.5GB 10000 rpm Cheetah 7.9ms	\$669	\$729
Seagate 9.1GB 10000 rpm Cheetah 7.9ms	\$1069	\$1129
Seagate 23GB 5400 rpm Elite 11ms	\$1789	\$1889

## Laser Printers

- Epson Stylus Color 3000, 17x22, Serial, Ink, 1440dpi \$1739
- Epson Stylus Color 800, 8.5x11, Serial, Ink, 1440dpi \$349
- GCC EL 1212, 1200dpi, 8.5x14, Enet, 12ppm \$1379
- GCC XL 608, 600dpi, 11x17, Ethernet, 8ppm \$1899
- GCC XL 616, 600dpi, 11x17, Ethernet, 16ppm \$2099
- GCC XL 808, 800dpi, 11x17, Ethernet, 8ppm \$2499
- GCC XL 1208, 1200dpi, 11x17, Ethernet, 8ppm \$3199
- GCC XL 1208SS, 1200dpi, 11x17, Ethernet, 8ppm \$4199

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**1MB L2 Cache For PCI PowerMacs.**  
**\$152**  
 Increase processor scores by up to 30%

**Magic Sony 2x/6x Speed CD-R External Drive**  
 Includes SCSI cable, terminator, Astarte Toast v3.5, 1Pc. media  
**\$399**

**POWERLOGIX**  
**PowerForce G3 250Mhz/250Mhz 1:1 Ratio**  
**\$1449**

**UMAX Astra 1200s 600dpi Scanner**  
**\$239**

## Digital Cameras

Kodak Digital DC-50	.....\$599
Kodak Digital DC-210	.....\$859
Agfa ePhoto 307	.....\$279
Sony Mavica w/Zoom	.....\$689
Olympus D220L	.....\$487
Olympus D500L	.....\$869
Olympus D600L	.....\$1259

**\$195**  
**Agfa SnapScan 310**

AGFA Snapscan 600	.....\$385
AGFA Snapscan 600 Artline	.....\$519
AGFA StudioStar For Mac	.....\$697
AGFA StudioStar For PC	.....\$697
Agfa Arcus II Mac/PC	.....\$1569
AGFA Arcus II *Solo*	.....\$1279
AGFA DuoScan	.....\$3599

## Iomega

**Iomega Zip**  
**\$143**

Zip Drive External	.....\$143
Zip Drive Internal (Tan)	.....\$149
Jaz/Jaz Internal Kits	.....\$23
Jaz Drive Internal (Tan)	.....\$199
Magic Jaz Drive External	.....\$349
Jaz Drive 1GB Carts	.....\$86
Jaz Drive External 2GB	.....\$619

## PowerBook 1400c/166

**\$1999**

**ATI VR PCI w/RagePro**  
**\$259**  
 Includes Director v5.0

## UMAX PowerLook II Scanner

**\$1129**

**Magic Yamaha 4x/2x/6x Speed CD-R Drive External ReRecordable**  
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512k L2 Cache DIMM	32MB SIMM 60ns	.....\$85
PowerLogix 1MB Cache	256k L2 Cache SIMM	.....\$15.99
1MB VRAM DIMM	1MB L2 Cache 61/71/8100	.....\$139
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Starmax, PowerTools, Apple 4400	Exclusively for the new G3 Macs	
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16MB 168-Pin DIMM 60ns	64MB 100Mhz SDRAM	.....\$219
32MB 168-Pin DIMM 60ns	128MB 100Mhz SDRAM	.....\$439

## Processor Card Upgrades

<b>POWERLOGIX</b>	<b>newer technology</b>
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PowerBoost Pro 233Mhz	.....\$419
PowerForce G3 250/250 1:1	.....\$1499
PowerForce G3 233/117Mhz	.....\$799
PowerForce G3 250/125Mhz	.....\$999
PowerForce G3 266/177Mhz	.....\$1199
PowerForce G3 275/183Mhz	.....\$1299
MAXpowr G3 250/512k	.....\$739*
MAXpowr G3 266/133Mhz	.....\$1219
MAXpowr G3 275/183Mhz	.....\$1199
MAXpowr G3 275/275Mhz	.....\$1799*
MAXpowr G3 6100 210Mhz	.....\$499
MAXpowr G3 6100 240Mhz	.....\$699
MAXpowr G3 71/8100 210Mhz	.....\$599
MAXpowr G3 71/8100 240Mhz	.....\$799

<b>XLR8</b>	<b>Imactell</b>
XLR8 MACH Spd 200Mhz	.....\$297
XLR8 MACH Spd 233Mhz	.....\$428
XLR8 MACH G3 233/512k	.....\$799
XLR8 MACH G3 266/512k	.....\$999
XLR8 MACH G3 266/1MB	.....\$1499
XLR8 MACH G3 300/1MB	.....\$1899
PowerJolt 233Mhz 604e	.....\$399
G3 PowerJolt 266/512k	.....\$1199
G3 PowerJolt 250/1MB	.....\$1349
G3 PowerJolt 300/1MB	.....\$2699

## High Performance Drives & Fast/Wide Cards

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Quantum Atlas III 9.1GB	Seagate Barracuda 4.5GB XL	.....\$599
Quantum Atlas III 18.2GB	SCSI Cards:	
Quantum Viking 2GB	Initio Fast/Wide	.....\$229
Quantum Viking 4GB	Jackhammer Fast/Wide	.....\$359
Seagate Cheetah 4.5GB	ATTO Express PCI Fast/Wide	.....\$329
Seagate Cheetah 9.1GB	Adaptec 2940UW Fast/Wide	.....\$297

## Video Cards 2D/3D Accelerators

IX Micro ProREZ 4MB	.....\$299
IX Micro UltimateREZ 8MB	.....\$539
IX Micro MacRocket 4MB	.....\$539
Matrox Millennium II 4MB	.....\$219
Matrox Millennium II 8MB	.....\$339
Vision 3D Imagine II 8MB	.....\$595
Vision 3D Imagine III 8MB	.....\$839
ATI Nexus 2D/3D 8MB	.....\$444*
ATI VR 3D w/Rage Pro 4MB	.....\$209*
Newer RenderPIX 2/4MB	.....\$1349

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IX Micro 4MB	.....\$169	UMAX 200Mhz	.....\$149.99
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<b>PowerMac G3 750/266Mhz</b> <b>\$80/mo</b>	<b>PowerMac G3 750/233Mhz</b> <b>\$66/mo</b>
<ul style="list-style-type: none"> <li>• 750PowerPC 233Mhz!</li> <li>• Sleek Desktop Case</li> <li>• 24x Speed CD-ROM</li> <li>• 4GB 5400RPM IDE HD, Internal Zip</li> <li>• 32MB RAM, 512k Cache, 2MB VRAM</li> <li>• Keyboard and Mouse included</li> <li>• 1-Year Apple Warranty</li> </ul>	<ul style="list-style-type: none"> <li>• 750PowerPC 233Mhz!</li> <li>• Sleek Desktop Case</li> <li>• 24x Speed CD-ROM</li> <li>• 4GB 5400RPM IDE HD</li> <li>• 32MB RAM, 512k Cache, 2MB VRAM</li> <li>• Keyboard and Mouse included</li> <li>• 1-Year Apple Warranty</li> </ul>

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C600I/200 16/2.1/CD/28.8	.....\$1199
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3228MB	9.5ms	5400rpm	512K	FB33200S	3yr	<b>\$235</b>	<b>\$289</b>
4310MB	9.5ms	5400rpm	512K	FB34300S	3yr	\$279	\$329
4550MB	8ms	7200rpm	512K	VK34550S	5yr	\$349	\$399
4550MB	8ms	7200rpm	512K	XP34550S	5yr	\$469	\$519
6448MB	9.5ms	5400rpm	512K	FB36400S	3yr	<b>\$359</b>	<b>\$409</b>
8455MB	9.5ms	5400rpm	512K	FB38400S	3yr	<b>\$459</b>	<b>\$509</b>
9100MB	8ms	7200rpm	512K	XP39100S	5yr	\$749	\$799
ULTRA WIDE SCSI (Adaptec PCI Wide controller only \$195 with drive!)							
2275MB	8ms	7200rpm	512K	VK32275W	5yr	\$249	\$339
2275MB	8ms	7200rpm	512K	XP32275W	5yr	<b>\$199</b>	<b>\$289</b>
4550MB	8ms	7200rpm	512K	VK34550W	5yr	\$349	\$439
4550MB	8ms	7200rpm	512K	XP34550W	5yr	\$479	\$569
9100MB	8ms	7200rpm	512K	XP39100W	5yr	\$749	\$839

Seagate

2150MB	11ms	5400rpm	128K	ST52160N	3yr	\$199	\$259
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4550MB	9.1ms	7200rpm	512K	ST34555N	3yr	\$325	\$375
4550MB	8ms	7200rpm	512K	ST34572N	5yr	\$469	\$519
4550MB	7.5ms	10,000rpm	512K	ST34501N	5yr	\$599	\$649
9100MB	8ms	7200rpm	512K	ST19171N	5yr	\$749	\$799
9100MB	8ms	10,000rpm	512K	ST19101N	5yr	\$949	\$999
23200MB	13ms	5400rpm	512K	ST423451N	5yr	\$1669	\$1759
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4550MB	8ms	7200rpm	512K	ST34572W	5yr	\$499	\$589
4550MB	7.5ms	10,000rpm	512K	ST34501W	5yr	\$599	\$689
9100MB	8ms	7200rpm	1024K	ST19171W	5yr	\$759	\$849
9100MB	8ms	10,000rpm	512K	ST19101W	5yr	\$969	\$1059
23200MB	13ms	5400rpm	512K	ST423451W	5yr	\$1689	\$1839

IBM

4550MB	8.5ms	5400rpm	512K	IBM34330N	5yr	\$295	\$345
9100MB	7.5ms	7200rpm	512K	IBM39130N	5yr	\$729	\$779
9100MB	6.5ms	7200rpm	1MB	IDGHS09Z	5yr	\$959	\$1009
18200MB	7.5ms	7200rpm	1MB	IDGHS18Z	5yr	\$1759	\$1809
ULTRA WIDE SCSI (Adaptec PCI Wide controller only \$195 with drive!)							
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9100MB	7.5ms	7200rpm	512K	IBM39130W	5yr	\$749	\$849
9100MB	6.5ms	7200rpm	1MB	IDGHS09U	5yr	\$959	\$1059
9100MB	6.5ms	10020rpm	1MB	IDVGS9U	5yr	\$1019	\$1119
18200MB	7.5ms	7200rpm	1MB	IDGHS18U	5yr	\$1759	\$1859

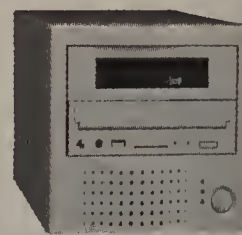
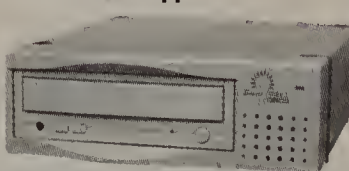
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2100MB	8ms	7200rpm	512K	WDE2170N	5yr	\$339	\$389
4300MB	8ms	7200rpm	512K	WDE4360N	5yr	\$489	\$539
9100MB	8ms	7200rpm	512K	WDE9100N	5yr	\$739	\$789
ULTRA WIDE SCSI (Adaptec PCI Wide controller only \$195 with drive!)							
2100MB	8ms	7200rpm	512K	WDE2170N	5yr	\$349	\$439
4300MB	8ms	7200rpm	512K	WDE4360N	5yr	\$499	\$589
9100MB	8ms	7200rpm	512K	WDE9100N	5yr	\$749	\$839

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50 Pack [CDR74P-50]	\$149	\$145	[CDR74PB-50]	\$129	\$119
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Plextor 20X 95ms 512K Tray	\$249 [PX20TSM]
NEC 24X 85ms 128K Tray	\$179 [CDR1810XM]
Pioneer 24X 90ms 6 Disk Changer	\$419 [DRM6324XM]
Teac 32X 85ms 512K Tray	\$179 [CD532SXM]
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4-8GB, 90MB/min	\$829 [SDT7000XM]	32-64GB, 90MB/min	\$1949 [TSL7000XM]
<b>Seagate 4mm</b> 2-4GB, 66MB/min	\$679 [STD24000XM]	12-24GB, 120MB/min	\$1109 [STD224000XM]
4-8GB, 60MB/min	\$849 [STD28000XM]	48-96GB, 120MB/min	\$2419 [STL496000XM]
<b>Hewlett Packard 4mm</b> 2GB, 11MB/min	\$679 [C1534XM]	12-24GB, 120MB/min	\$1199 [C1554XM]
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<b>Exabyte 8mm</b> 7-14GB, 60MB/min	\$729 [EXB8700LTXM]	20-40GB, 360MB/min	\$3549 [EXB8900XM]
7-14GB, 120MB/min	\$1549 [ELIANTXM]	70-140GB, 60MB/min	\$4249 [EXB10HXM]
<b>Quantum DLT</b> 15-30GB, 150MB/min	\$2569 [DLT2000XTXM]	100-200GB, 180MB/min	\$5809 [DLT4500M]
20-40GB, 180MB/min	\$2889 [DLT4000XM]	105-210GB, 150MB/min	\$6539 [DLT2700XTM]
35-70GB, 600MB/min	\$6449 [DLT7000XM]	140-180GB, 150MB/min	\$7869 [DLT4700M]
75-150GB, 150MB/min	\$4719 [DLT2500XTM]		
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## APS HIGH-PERFORMANCE ULTRA SCSI DRIVES

Model	Description	EL	Int.	SR 2000	Pro
APS Q 2000	Quantum Fireball ST, 2079MB, 5.4K	\$199 <sup>95</sup>	\$219 <sup>95</sup>	\$289 <sup>95</sup>	\$319 <sup>95</sup>
APS Q 3000	Quantum Fireball ST, 3118MB, 5.4K	229 <sup>95</sup>	249 <sup>95</sup>	319 <sup>95</sup>	349 <sup>95</sup>
APS Q 4000	Quantum Fireball ST, 4110MB, 5.4K	279 <sup>95</sup>	299 <sup>95</sup>	369 <sup>95</sup>	399 <sup>95</sup>
APS Q 6400	Quantum Fireball ST, 6236MB, 5.4K	359 <sup>95</sup>	379 <sup>95</sup>	449 <sup>95</sup>	479 <sup>95</sup>
APS Q 8000	Quantum Fireball ST, 8191MB, 5.4K	479 <sup>95</sup>	499 <sup>95</sup>	569 <sup>95</sup>	599 <sup>95</sup>
APS Q 4300	Quantum Atlas II, 4341MB, 7200 rpm		479 <sup>95</sup>	549 <sup>95</sup>	579 <sup>95</sup>
APS Q 9000	Quantum Atlas II, 8682MB, 7200 rpm		749 <sup>95</sup>	819 <sup>95</sup>	849 <sup>95</sup>
APS ST 2000	Seagate Barracuda, 2157MB, 7200 rpm		379 <sup>95</sup>	449 <sup>95</sup>	479 <sup>95</sup>
APS ST 4300	Seagate Barracuda, 4340MB, 7200 rpm		549 <sup>95</sup>	619 <sup>95</sup>	649 <sup>95</sup>
APS ST 4500	Seagate Cheetah, 4348MB, 10000 rpm		649 <sup>95</sup>	N/A	749 <sup>95</sup>
APS ST 9000	Seagate Barracuda, 8683MB, 7200 rpm		779 <sup>95</sup>	849 <sup>95</sup>	879 <sup>95</sup>
APS ST 9100	Seagate Cheetah, 8681MB, 10000 rpm		999 <sup>95</sup>	N/A	1,099 <sup>95</sup>
APS WD 2000	Western Digital Enterprise, 7200 rpm		379 <sup>95</sup>	449 <sup>95</sup>	479 <sup>95</sup>
APS WD 4300	Western Digital Enterprise, 7200 rpm		579 <sup>95</sup>	649 <sup>95</sup>	679 <sup>95</sup>

## APS HIGH-PERFORMANCE ULTRA SCSI DRIVES

Model	Description	Full Height
APS ST 23000	Seagate Elite 23, 22.1GB, 5400 rpm	\$1,799 <sup>95</sup>
APS ST 23000 W	Seagate Elite 23, 22.1GB, 5400 rpm	1,899 <sup>95</sup>

## APS ULTRA WIDE SCSI DRIVES

Model	Description	Int.	SR 2000	Pro
APS Q 4300 W	Quantum Atlas II, 4341MB, 7200 rpm	\$499 <sup>95</sup>	\$569 <sup>95</sup>	\$599 <sup>95</sup>
APS Q 4500 W	Quantum Viking, 4345MB, 7200 rpm	579 <sup>95</sup>	649 <sup>95</sup>	679 <sup>95</sup>
APS Q 9000 W	Quantum Atlas II, 8682MB, 7200 rpm	779 <sup>95</sup>	849 <sup>95</sup>	879 <sup>95</sup>
APS ST 2000 W	Seagate Barracuda, 2157MB, 7200 rpm	399 <sup>95</sup>	469 <sup>95</sup>	499 <sup>95</sup>
APS ST 4300 W	Seagate Barracuda, 4340MB, 7200 rpm	579 <sup>95</sup>	649 <sup>95</sup>	679 <sup>95</sup>
APS ST 4500 W	Seagate Cheetah, 4348MB, 10,000 rpm	699 <sup>95</sup>	N/A	799 <sup>95</sup>
APS ST 9000 W	Seagate Barracuda, 8683MB, 7200 rpm	799 <sup>95</sup>	869 <sup>95</sup>	899 <sup>95</sup>
APS ST 9100 W	Seagate Cheetah, 8681MB, 10,000 rpm	1,049 <sup>95</sup>	N/A	1,149 <sup>95</sup>
APS WD 2000 W	Western Digital Enterprise, 7200 rpm	429 <sup>95</sup>	499 <sup>95</sup>	529 <sup>95</sup>
APS WD 4300 W	Western Digital Enterprise, 7200 rpm	599 <sup>95</sup>	669 <sup>95</sup>	699 <sup>95</sup>

## APS IDE DRIVES

Model	Description	Internal
APS Q 3000	Quantum Fireball ST, 3118MB, 5400 rpm	\$199 <sup>95</sup>
APS Q 4000	Quantum Fireball ST, 4136MB, 5400 rpm	249 <sup>95</sup>
APS Q 6400	Quantum Fireball ST, 6236MB, 5400 rpm	329 <sup>95</sup>

## APS POWERBOOK STORAGE

Model	Description	Internal
APS T 2000	Toshiba MK2103MAV, 2067MB, 4200 rpm IDE	\$299 <sup>95</sup>

## APS REMOVABLE DRIVES

Model	Description	SR 1000	SR 2000	Pro
APS SQ 5200	SyQuest 5200, 190MB	N/A	\$389 <sup>95</sup>	N/A
APS Jaz	(with 1 cartridge) 1GB	349 <sup>95</sup>	349 <sup>95</sup>	399 <sup>95</sup>
APS Jaz II	(with 1 cartridge) 2GB	Call	Call	Call

## APS MO DRIVES

Model	Description	SR 1000	SR 2000	Pro
APS 640 MO	Fujitsu M2513A2#N	N/A	419 <sup>95</sup>	449 <sup>95</sup>
APS 2.6GB MO	Sony SMD-F544, 2.4GB	N/A	1,669 <sup>95</sup>	1,699 <sup>95</sup>

## APS CD-ROM DRIVES

Model	Description	External
APS CD32	32X CD-RDM in Slimline Case	\$159 <sup>95</sup>
APS CD Changer	Nakamichi 5 Disc/16X CD-RDM, Pro Case only	299 <sup>95</sup>
APS CD-R Plus	2X record/6X read CD-R (Sony)	379 <sup>95</sup>
APS CD-R Pro	4X record/6X read CD-R in Pro Enclosure	529 <sup>95</sup>
APS CD-R Pro	4X record/6X read CD-R in Full Height Enclosure	729 <sup>95</sup>
APS CD-RW	2X record/6X read CD-RW in Pro Enclosure	529 <sup>95</sup>
APS CD-RW Pro	4X record/6X read/2X rewrite CD-RW, Pro Enclosure	599 <sup>95</sup>
APS Jaz/CD-R System	2X record/6X read CD-R	749 <sup>95</sup>
APS 2GB/CD-RW Sys.	Q.2000 Hard Drive & 2X record/6X read CD-RW	799 <sup>95</sup>

\*Available in an SR 2000 Enclosure for an additional \$50.00

## APS TAPE BACKUP SYSTEMS

Model	Description	Internal	External
APS HyperQIC <sup>®</sup>	Travan 4 Conner QIC 3095, 8GB	\$349 <sup>95</sup>	\$399 <sup>95</sup>
APS HyperDAT <sup>®</sup>	DDS-2DC, 8GB	549 <sup>95</sup>	599 <sup>95</sup>
APS HyperDAT <sup>®</sup> Pro	DDS-2DC, 8GB	849 <sup>95</sup>	899 <sup>95</sup>
APS HyperDAT <sup>®</sup> III	DDS-3DC, 24GB	1,149 <sup>95</sup>	1,199 <sup>95</sup>
APS Mini Library	4mm DDS-2 AutoLoader, 64GB	N/A	2,399 <sup>95</sup>
APS DLT30	DLT 3000, 30GB	N/A	2,499 <sup>95</sup>
APS DLT40	DLT 4000, 40GB	N/A	2,999 <sup>95</sup>
APS DLT70	DLT 7000, 70GB	N/A	6,999 <sup>95</sup>
APS AIT <sup>*</sup>	8mm W/DC, 50GB	N/A	3,199 <sup>95</sup>
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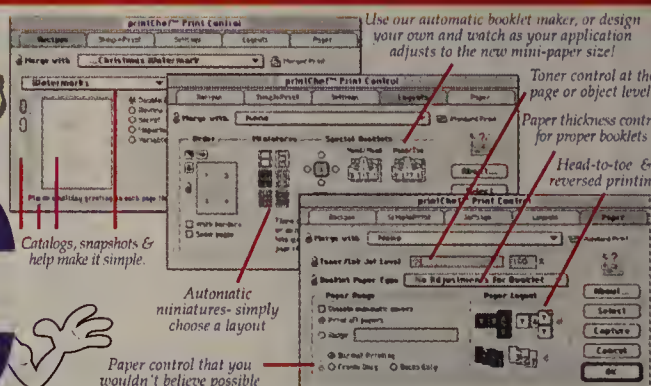
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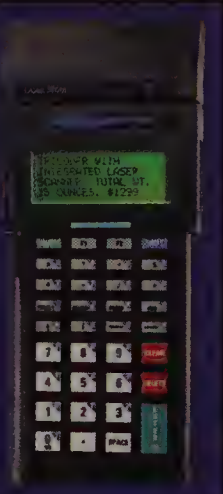


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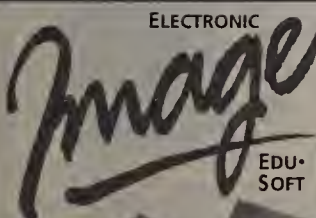
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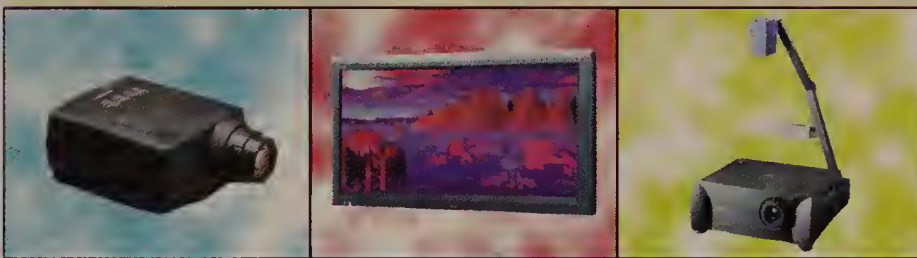
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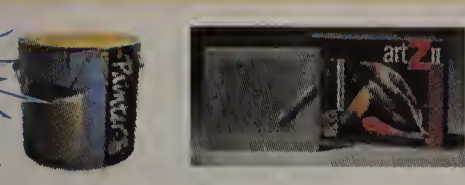
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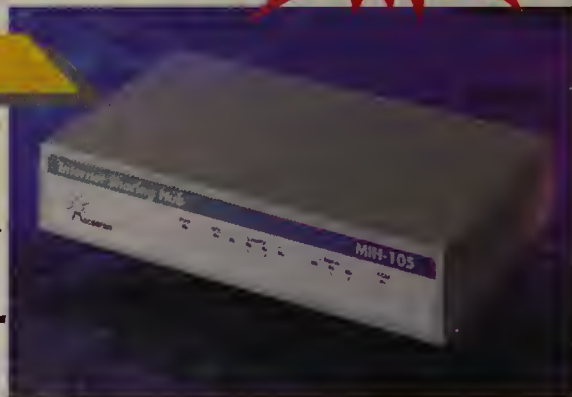
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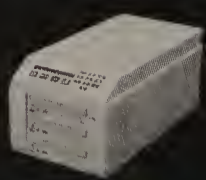
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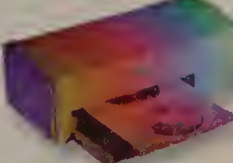
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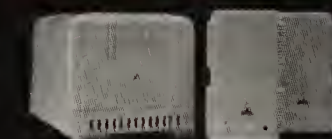
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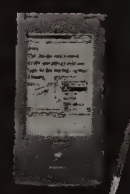
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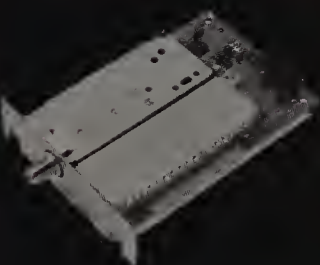
- Many software titles available
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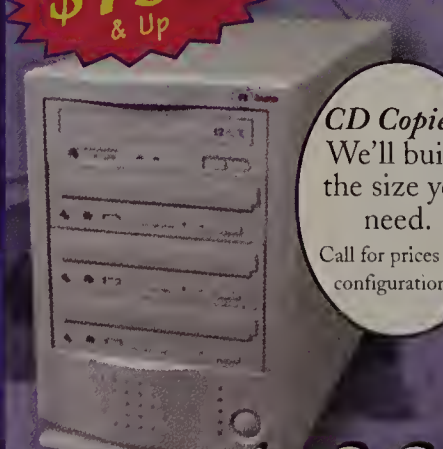
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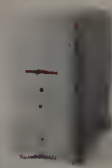


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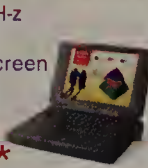
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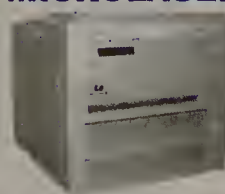
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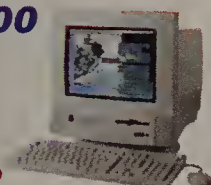
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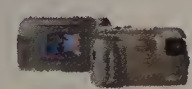
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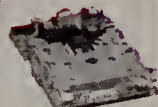
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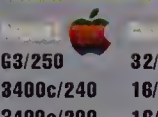
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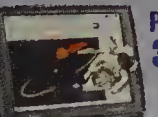
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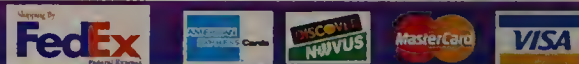
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**NewTek**  
LightWave 3D (Pro-Level animation).....\$1399.

**Quark**  
QuarkXpress Passport (multi-language).....\$1,299.  
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## Adobe Illustrator 7.0 Upgrade

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### Artel Software

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### DigiEffects

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Cynelook (makes your video look like film).....\$599.

### Knoll soft.

Lens Flare Pack 1.5 (after effects plug-in).....\$139.

### MetaTools

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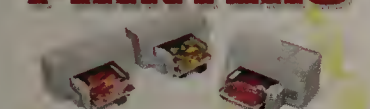
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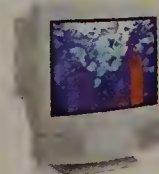
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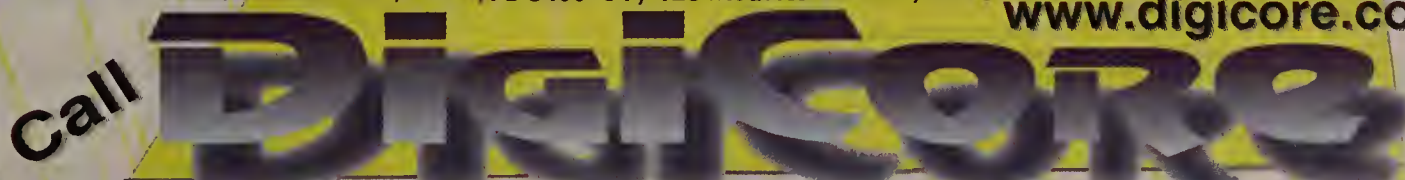
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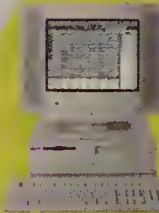
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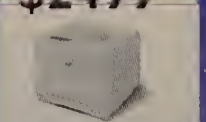
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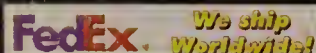
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<b>Powerbook®</b> <b>G3/250</b> <small>250MHz 32/5GB/20xCD ACTIVE</small> <b>\$4499</b>	<b>Power Macintosh®</b> <b>8600</b> <small>300MHz 32/4G/24xCD ZIP/KB</small> <b>\$2259</b>	<b>Power Macintosh®</b> <b>9600</b> <small>200MHz 32/4G/CD/KB 200MP 32/4G/CD/KB</small> <b>\$2089 \$3099</b>	<b>Power Macintosh®</b> <b>9600</b> <small>300MHz 64/4G/24xCD KB</small> <b>\$2859</b>	<b>Power Macintosh®</b> <b>9600</b> <small>350MHz 64/4G/24xCD KB</small> <b>\$3439</b>																																																																																																				
<b>PowerBook®</b> <b>3400</b> <small>200MHz 16/2GB/CD 240MHz 16/3G/12XCD</small> <b>\$2799 \$3139</b>	<b>PowerBook®</b> <b>1400</b> <small>CS/166 16/1.3G/CD C/166MHz 16/2GB/8XCD</small> <b>\$1639 \$1859</b>	<b>SONY</b> <b>100ES/100GS</b> <small>15" Monitor .25 Dot Pctch</small> <b>\$335/365</b>	<b>New! SONY</b> <b>SONY</b> <b>200ES/200GS</b> <small>17" Monitor .25 Dot Pctch</small> <b>\$589/649</b>	<b>SONY Sale!</b> <b>SONY</b> <b>400PS/300SF</b> <small>19" 20"</small> <b>\$1059/1149</b>																																																																																																				
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			<b>AGFA</b> <table border="0"> <tr><td>MC620 17"</td><td>499</td></tr> <tr><td>MC7515 19"</td><td>899</td></tr> <tr><td>MC801 21"</td><td>1199</td></tr> <tr><td>MC801HR 21"</td><td>1459</td></tr> </table>	MC620 17"	499	MC7515 19"	899	MC801 21"	1199	MC801HR 21"	1459	<b>IXMicro</b> <table border="0"> <tr><td>2100 8MB</td><td>899</td></tr> <tr><td>2000 5MB,KB</td><td>799</td></tr> <tr><td>2MB / 4MB</td><td>69/139</td></tr> <tr><td>Keyboard</td><td>79</td></tr> </table>	2100 8MB	899	2000 5MB,KB	799	2MB / 4MB	69/139	Keyboard	79																																																																																				
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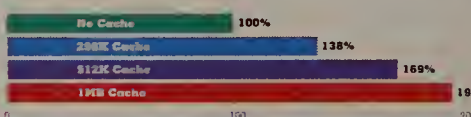
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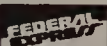
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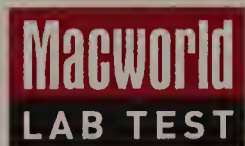
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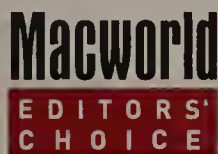
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continued from page 178

Now I know. ComputerESP ([www.uvision.com](http://www.uvision.com)) tracks thousands of prices for computer gear—and shows you a list of mail-order outfits' prices for your item, sorted by price. Although I have much nostalgic affection for Mac Warehouse and its ilk, I'd rather not foot the bill for their weekly catalogs by paying higher prices. For example, compared with the best prices listed on ComputerESP, MacMall charges \$20 more for RAM Doubler/Speed Doubler, \$18 more for a Global Village 56K modem, and \$100 more for a PowerBook 2400.

### Amazon.com

Surprising Book Economics 101: of the \$20 you pay for *Macs for Dummies*, a sumptuous 65 cents winds up in my bank account. Where does the other \$19.35 go? Some to the publisher, of course, but 50 percent or more goes to the bookstore.

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### E-banking

Stay with me here: when do you pay your bills? If you pay the day they arrive in the mail, whomever you're paying gets your money *today*, even though it's not technically due for several weeks. That money could have been sitting in your bank account, earning interest. But if you wait

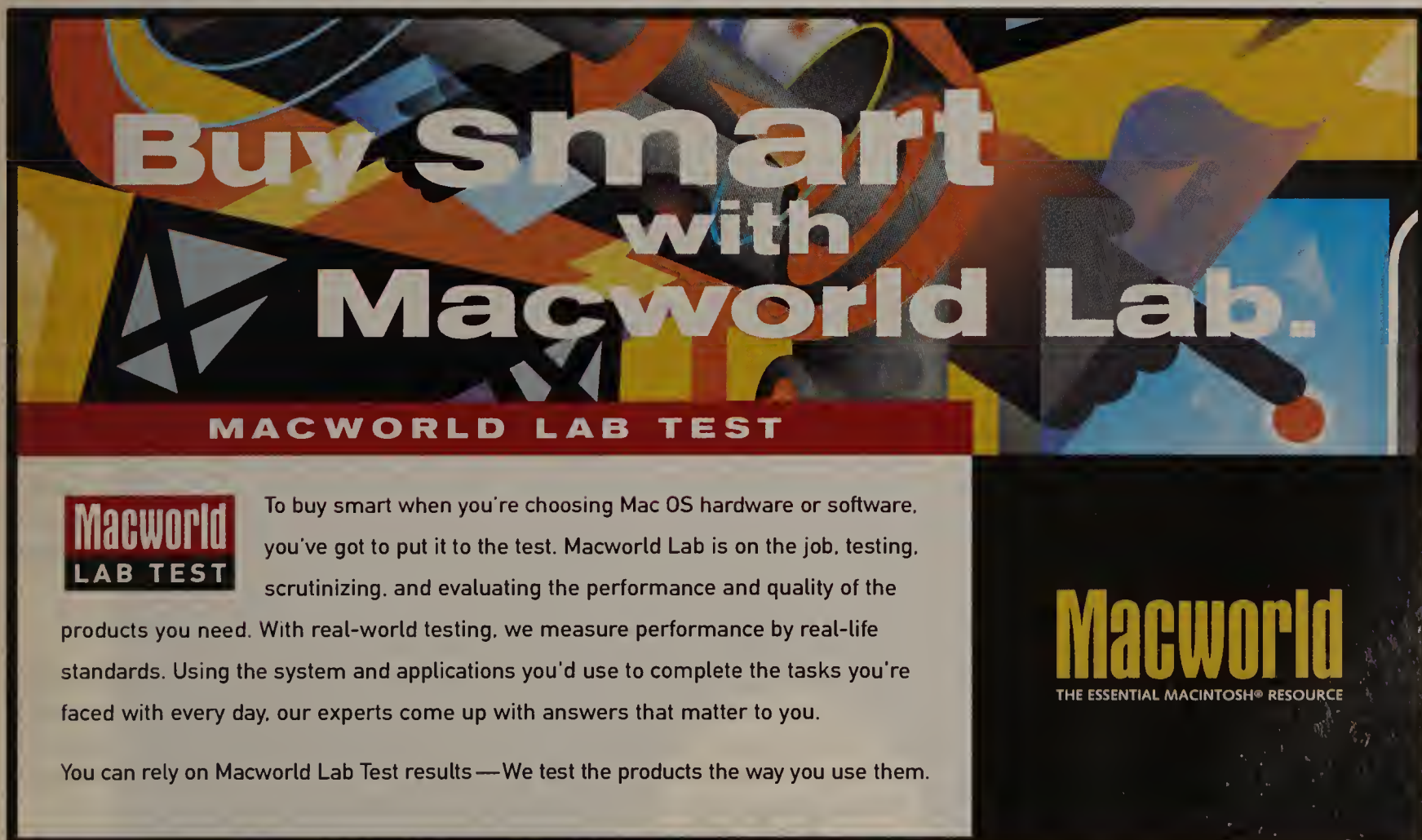
until just before the due date to mail the check, timing becomes critical; miss the deadline and you're charged late fees.

If you pay your bills electronically, though, using Intuit's Quicken or your bank's Web site, you *input* the payment whenever you want but the check won't get *sent* until the date you specify. Suppose your mortgage, credit-card, utilities, phone, cable TV, car-loan, and Internet bills total about \$3,500 a month. Assuming 5 percent interest in the bank, in the three weeks between a bill's arrival and the due date, that \$3,500 could have racked up \$10.02 in interest! Yes, \$120 a year is what you *give away* to those money-grubbing corporations if you pay promptly to get the bills off your mind.

Actually, you save more than \$120 by doing your bills electronically—you're also spared the hassle of writing checks, stuffing envelopes, and so on. That's handy to remember, because as far as I'm concerned, time isn't just money—it's *time*. **m**

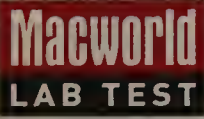
DAVID POGUE ([www.poguelman.com](http://www.poguelman.com)) is the editor of *The Microslut Joke Book* (Berkley Books, 1997).

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# The Desktop Critic

by David Pogue

## The Cheapskate's Guide to the Web

FIVE WEBBY WAYS TO HOLD ON TO MORE OF YOUR MONEY

**I** WAS A LATE BLOOMER ON the World Wide Web. What did I want with chat rooms, games, and *Dilbert* cartoons? As far as I could see, they're just glorified time-killers—the last thing a freaked-out-busy, deadline-chasing, Type-AAA personality like me needs. Aimlessly cruise the Web? Are you *kid-ding*? Listen, the last movie I saw in a theater was *Kramer vs. Kramer*.

But a couple of years ago, a funny thing happened: clever entrepreneurs began setting up shop on the Web—not just glorified mail-order catalogs, but businesses that *depend* on the nature of the Web. These companies slash middlemen and markups out of the marketplace, making a profit while still saving the customers money.

These remarkable Web sites intrigue me for two reasons. First, they save me time. (*Yes!*) Second, these sites seem to make everybody money at nobody's expense. Whenever I'm offered a way to keep more of mine, I go for it.

I recently tallied the savings I'd accrued by doing things on the Web: more than \$5,000 in the last two years. I'd be shirking my duties as a Mac reporter if I didn't share my findings.

### Auto-By-Tel

In 1996 I wanted to buy a Honda Civic. I went to the local dealer. "Oh, you want a Civic, do ya?" said the guy. "And I suppose you'd also like us to throw in a couple front-row Superbowl tickets? HAW haw haw!"

When his hilarity subsided, he explained that the Civic was such a hit in Europe that Honda was getting an extra \$2,000 per car there, making Civics practically unavailable in the States. But he did offer to let me add my name to the waiting list—if I agreed to pay \$1,000 *over* the sticker price.

When Honda dealerships No. 2 and

3 gave me the same story, I was ready to try anything. I gingerly snuck over to [www.autobytel.com](http://www.autobytel.com). For a skinflint like me, Auto-By-Tel's scheme is nearly irresistible: You indicate the car you want to buy, complete with options. The nearest participating car dealer (there are 2,600 nationwide) e-mails you back with a cut-rate offer. There's no charge for any of this—and no obligation to accept the offer. It sure seemed no-lose to me.

Sure enough, two days later, a dealer 30 minutes away wrote me. "Unfortunately, '96 Civics are in extremely short supply," his message said. "The best we

drives, sales commissions, and so on.

My only regret is that I didn't think up Auto-By-Tel first.

### United Computer Exchange

You can't buy just one Mac in your lifetime; sooner or later, you'll want to upgrade. But how do you sell your outgoing Mac? If you sell locally, you worry that someone out in America-land might have paid more. As for Internet classifieds, how can two strangers be confident that the computer will show up or that the check won't bounce?

United Computer Exchange ([www.uce.com](http://www.uce.com)) solves both problems by handling the transaction for you. In exchange for a commission of 10 to 15 percent (paid by the buyer, based on selling price), the company advertises your Mac to the entire Internet population and forwards offers to you. When you accept a bid, UCE receives your computer, cleans it up, checks it out, and ships it on to the buyer. The buyer has two days to inspect the machine; if all is kosher, the deal goes through. Buyer and seller are both protected.

The only thing better than selling a Mac via UCE is buying one there. You get a great education in pricing: for example, asking prices for a Power Mac 7100 range from \$600 to \$1,500. Makes you shudder to think: if you didn't have a *national* Web database to scan, you might have been the poor slob who thought \$1,500 was the going rate.

### ComputerESP

I used to break out in hives when buying mail-order computer stuff. How could I be sure I was getting the lowest price? Surely some store, somewhere, was selling this item cheaper.

*continues on page 177*



can offer you is \$1,200 under sticker price." I blinked in happiness. Ah, bliss! Ah, savings! Ah, revenge!

When I picked up the car, it got better. Since there was no haggling, the dealership guy was friendly and congratulatory instead of phony and predatory. Now *this*, I thought, is the way to buy a car.

Auto-By-Tel makes money by charging a fee to each participating dealer. The dealers make money by receiving hundreds of ready-to-buy customer names off the Web. And you save money because your price doesn't reflect advertising, test



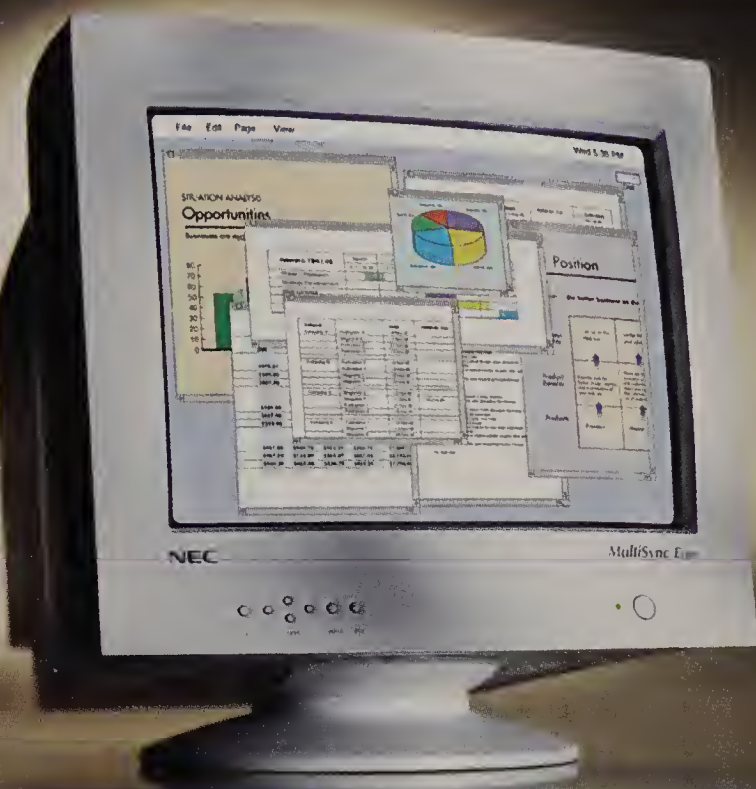


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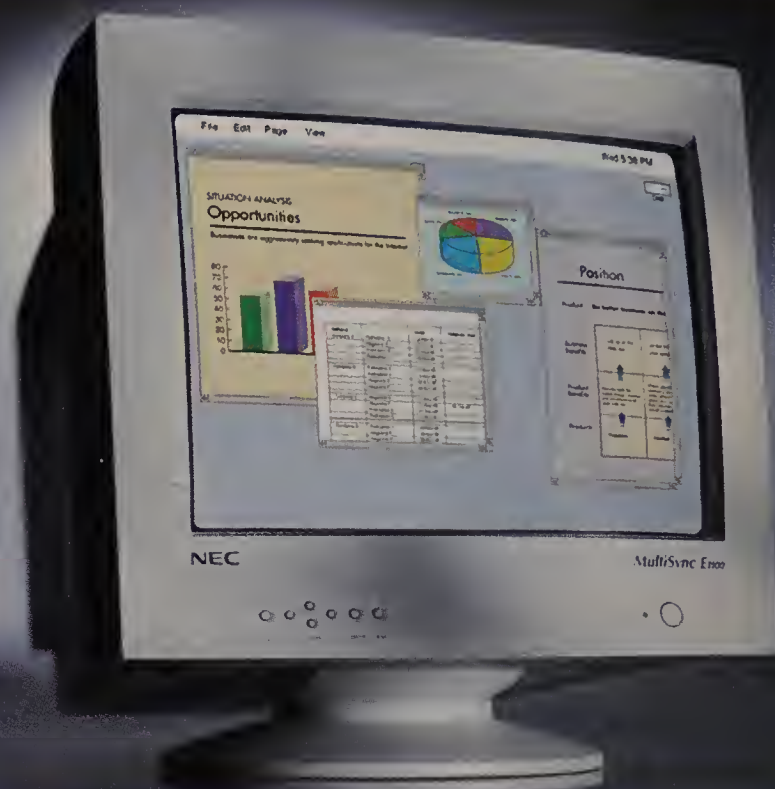




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